Agenda

AIRPORTS COMMITTEE

March 3, 2014
1:00 P.M.
550 Sally Ride Drive, Concord

Supervisor Mary N. Piepho, Chair
Supervisor Karen Mitchoff, Vice Chair

Agenda Items:	Items may be taken out of order based on the business of the day and preference of the Committee

1. Introductions

2. Review and Approve record of meeting for September 23, 2013

3. Public comment on any item under the jurisdiction of the Committee and not on this agenda (speakers may be limited to three minutes).

4. Receive update from the Aviation Advisory Committee (Mike Bruno, Aviation Advisory Committee Chair)

5. Budget for Fiscal Year 2012/13 Final (Update)

6. Budget for Fiscal Year 2013/14 (Update)

7. Airport Economic Development Program - Marketing Efforts (Discussion)

8. Airport Economic Development Program - Proposed Projects (Discussion)

9. Airport Economic Development Program - Retention Efforts (Discussion)

10. CPI Adjustment Waiver for County Hangar Tenants (Discussion/Action)

11. Infrastructure Analysis for the Byron Airport (Discussion)

12. The next meeting is currently scheduled for June 2, 2014.

13. Adjourn

The Airports Committee will provide reasonable accommodations for persons with disabilities planning to attend Airports Committee meetings. Contact the staff person listed below at least 96 hours before the meeting.

Any disclosable public records related to an open session item on a regular meeting agenda and distributed by the County to a majority of members of the Airports Committee less than 96 hours prior to that meeting are available for public inspection at 550 Sally Ride Drive, Concord, during normal business hours.

Public comment may be submitted via electronic mail on agenda items at least one full work day prior to the published meeting time.

For Additional Information Contact:

Keith Freitas, Committee Staff
Phone (925) 646-5722, Fax (925) 646-5731
kfrei@airport.cccounty.us

Contra Costa County Board of Supervisors

Subcommittee Report

AIRPORTS COMMITTEE **2.**

Meeting Date: 03/03/2014
Submitted For: Keith Freitas, Airports Director
Department: Airports
Referral No.:
Referral Name:
Presenter: **Contact:** Beth Lee, (925) 646-5722

Referral History:

N/A

Referral Update:

N/A

Recommendation(s)/Next Step(s):

N/A

Fiscal Impact (if any):

N/A

Attachments

Minutes 9-23-13

Contra Costa County Board of Supervisors
Airport Committee
Monday, September 23, 2013, 12:30 p.m.
550 Sally Ride Drive
Director of Airports Office

Draft Minutes

The meeting was called to order at 12:33 p.m. by Supervisor Mitchoff.

Supervisor Karen Mitchoff, Chair and Supervisor Mary Piepho, Vice Chair were introduced. County Staff present: Cliff Glickman, District IV Chief of Staff; Keith Freitas, Airport; Beth Lee, Airport; and Natalie Olesen, Airport.

2. Approval of Minutes

February 25, 2013 minutes were approved.

3. Public Comment:

None

4. Report by Aviation Advisory Committee (AAC)

Tom Weber, Vice Chair of the AAC, reported that the AAC meeting held at the Byron Airport had a really good turnout; approximately 20 members of the community were in attendance. Tom further stated that Ronald Reagan and Ed Young did a great job in outreach to the community to get more people to attend.

- At the last meeting of the AAC:
    - A representative from the Patriot Jet Team Foundation discussed the outreach they had made to local schools.
    - A presentation was given on State Route 239.
    - An update was given on the Bryon Airport infrastructure analysis.
- A noise complaint was referred to the AAC from a Pleasant Hill resident who wanted Buchanan Field to close on the weekends.
    - Tom Weber talked to the complainant by phone.
    - A meeting was held with the noise complainant, an AAC member, Airport staff and a local pilot to discuss the situation.
    - The complainant left the meeting with a better understanding of how the Airport operates and how weather conditions will affect the noise he hears.
- Letters will be going out in the next few months notifying parties that their representative’s term will be expiring.
    - The At-Large position was posted.
    - Tom Weber commented that he had been doing some outreach to help find candidates for the At-Large position.
    - Supervisor Mitchoff suggested doing outreach to women pilot groups in order to add more diversity on the AAC. Also suggested using social media.
    - Supervisor Piepho suggested contacting the Byron Jet Team to see if any of their members might be interested.

5. Byron Utility Analysis Update

Beth Lee reported that a Federal Aviation Administration (FAA) grant was received to perform the infrastructure analysis and to design pavement, lighting and signage enhancements.

The infrastructure analysis is in its final stages and should be completed in the next 30 to 45 days. The results will be used to start the General Plan amendment process for the Byron Airport.

Supervisor Piepho reported that there are plans to expand Clifton Forebay before more water starts being sent to Southern California.

- Supervisor Piepho suggested that Airport staff look over the Environmental Impact Report (EIR) on the project to see how the expansion will affect the Airport.
    - Supervisor Mitchoff commented that the EIR is due out in mid to late October and that there would be a 120 day response period.
- Supervisor Piepho commented that the expansion could have impacts on the Byron Airport like runway lengths, infrastructure and wildlife.

6. FAA Funding Application for Buchanan Field Wildlife Hazard Assessment Update

Keith Freitas reported that every year an FAA Certification Inspector does an inspection of Buchanan Field as the Part 139 Commercial Certificate has been maintained.

- All airports with Commercial Certification are required to update wildlife hazard assessments.
- Although Buchanan Field does not have any particular issues; FAA grant money was received to have a new assessment performed.
    - The assessment will start on or about October 1, 2013, and will take about 13 months to complete.
    - A final report will be completed which will identify potential hazards and things that can be done to mitigate them.

7. Airport Fiscal Year (F/Y) 2012/13 Budget at 99%

Keith Freitas reported that the Airport met its revenue target at 103% and expenses came in at 92% of budget.

- Capital Projects still need to be funded
    - Painting of hangars
    - Pavement repairs and replacement
- Recommendation was made to add $60,000 to the Airport Reserve Fund (Fund) bringing the fund total to $400,000.
    - Fund balance would then be consistent with County policy and the Fund policy.
    - Supervisor Mitchoff requested a copy of the F/Y 2013/14 budget be forwarded reflecting the Fund change. Footnote changes that note costs of funds dedicated from the Mariposa Community Benefit Fund ($800,000).

Supervisor Piepho asked if any of the Mariposa Community Benefit Fund (MCBF) monies had been used.

- Keith Freitas stated that the monies would be pulled when projects are complete.
- Supervisor Piepho asked to have footnotes added to the F/Y 2013/14 budget reflecting the projects and amounts of the MCBF that have been allocated.

8. Future Agenda Items

- Budget for F/Y 2013/14

Meeting was adjourned at 12:59 p.m.

Contra Costa County Board of Supervisors

Subcommittee Report

AIRPORTS COMMITTEE 5.

Meeting Date: 03/03/2014
Submitted For: Keith Freitas, Airports Director
Department: Airports
Referral No.:
Referral Name:
Presenter: **Contact:** Beth Lee, (925) 646-5722

Referral History:

N/A

Referral Update:

N/A

Recommendation(s)/Next Step(s):

N/A

Fiscal Impact (if any):

N/A

Attachments

Final Fiscal Year 2012/13 Budget

Airport Enterprise Fund Overview
Fiscal Year 2012-13 @ 99%
July 2012 through June 2013

	2011-12 Actual	2012-13 Budget	2012-13 Actual To Date	YTD @ 99%
Enterprise Fund O & M Budget				
Buchanan O & M Revenues	$3,368,006.46	$3,339,931.00	$3,537,100.45	105.90%
Byron O & M Revenues	$448,789.23	$522,071.00	$453,322.77	86.83%
Total O & M Revenues Enterprise Fund	**$3,816,795.69**	**$3,862,002.00**	**$3,990,423.22**	**103.33%**
Buchanan O & M Expenditures	$2,464,303.30	$2,968,322.00	$2,765,648.89	93.17%
Buchanan Capital Expenses (Non AIP)	$0.00	$86,968.00	$86,344.98	
Byron O & M Expenditures	$792,093.58	$750,938.00	$680,490.24	90.62%
Byron Capital Expenses (Non AIP)	$25,271.82	$0.00	$0.00	
Total O & M Expenditures Enterprise Fund	**$3,281,668.70**	**$3,806,228.00**	**$3,532,484.11**	**92.81%**
Reserve Fund - Current Balance:	**$340,000.00**			
Mariposa Fund:	**$800,000.00**			

Contra Costa County Board of Supervisors

Subcommittee Report

AIRPORTS COMMITTEE **6.**

Meeting Date: 03/03/2014
Submitted For: Keith Freitas, Airports Director
Department: Airports
Referral No.:
Referral Name:
Presenter: **Contact:** Beth Lee, (925) 646-5722

Referral History:

N/A

Referral Update:

N/A

Recommendation(s)/Next Step(s):

N/A

Fiscal Impact (if any):

N/A

Attachments

Budget Fiscal Year 2013/14

Airport Enterprise Fund Overview
Fiscal Year End 2012-13 and
2013-14 Budget

	2012-13 Actual	2013-14 (Budgeted)
Enterprise Fund O & M Budget		
Buchanan O & M Revenues	$3,537,100	$3,583,564
Byron O & M Revenues	$453,323	$431,833
Total O & M Revenues Enterprise Fund	**$3,990,423**	**$4,015,397**
Buchanan O & M Expenditures	$2,765,650	$3,219,620
Buchanan Capital Expenses (Non AIP)	$86,345	$105,000
Byron O & M Expenditures	$680,490	$690,777
Byron Capital Expenses (Non AIP)		$0
Total O & M Expenditures Enterprise Fund	**$3,532,485**	**$4,015,397**
Reserve Fund - Current balance to Date:		**$400,000**
Mariposa Fund:		**$800,000**

*Mariposa Fund: Approved Projects and Dollar Amount Dedicated (but not spent as yet)

1) $9,300.00: Byron Airport Infrastructure Analysis
2) $8,556.00: Byron Airport Airfield Pavement, Lighting and Signage Enhancements (In Process)
3) $250,000(high end estimate): General Plan Amendment and Associated Environmental Review

Contra Costa County Board of Supervisors

Subcommittee Report

AIRPORTS COMMITTEE **8.**

Meeting Date: 03/03/2014
Submitted For: Keith Freitas, Airports Director
Department: Airports
Referral No.:
Referral Name:
Presenter: **Contact:** Beth Lee (925) 646-5722

Referral History:

N/A

Referral Update:

N/A

Recommendation(s)/Next Step(s):

N/A

Fiscal Impact (if any):

N/A

Attachments

Proposed Projects

Potential Airport Capital Improvement Projects (2014 - 2024)

Airport & Project List			FAA Eligible
Buchanan Field Airport			
1) East Ramp Taxilane Rehabilitation	Estimated Construction Cost	$1,000,000	N/A
2) General Aviation Terminal & Airport Administrative Office	Estimated Construction Cost	$5,500,000	N/A
3) Sign Improvements	Estimated Cost	$325,000	N/A
4) Sally Ride North Connector	Estimated Cost Range	$340,000 - $450,000	N/A
5) Air Traffic Control Tower Replacement	Estimated Construction Cost	$7,000,000	Yes*
Byron Airport			
1) Airfield pavement, lighting & signage improvements	Estimated Cost	$800,000	Yes**
2) Hangar/Office/Ramp Construction	Estimated Construction Cost	$1,500,000	N/A
3) Runway Extension	Estimated Design Cost	$150,000	Yes**
	Estimated Construction Cost	$3,000,000	Yes**
4) Sanitary Sewer			
On-Site Septic System	Estimated Cost Range	$2,520,000 - $7,030,000	N/A
On-Site Water Treatment Plant (Constructed in Phases)	Estimated Cost Range	$1,100,000 - $3,340,000	N/A
On-Site Water Treatment Plant (Full Build Out in Near Term)	Estimated Cost Range	$1,695,000 - $2,560,000	N/A
Connect to Discovery Bay	Estimated Cost Range	$1,710,000 - $2,520,000	N/A
5) Domestic Water			
On-Site Water Wells & Water Treatment Plant	Estimated Cost Range	$1,310,000 - $2,880,000	N/A
Connect to Discovery Bay (Domestic Water Only)	Estimated Cost Range	$3,320,000 - $3,840,000	N/A
Connect to Byron Bethany Irrigation District (Domestic Water	Estimated Cost Range	$1,700,000 - $2,220,000	N/A
6) ARFF Truck	Estimated Cost	$400,000	N/A
7) Fire Protection			
Expand Existing System	Estimated Cost Range	$1,050,000 - $3,130,000	N/A
Connect to Discovery Bay	Estimated Cost Range	$4,900,000 - $6,980,000	N/A
8) Jet A Fuel Tank	Estimated Cost	$250,000	N/A
TOTAL RANGE: BOTH AIRPORTS		$22,725,000 - $37,205,000	

* FAA funding participation amount is unknown.

** Currently FAA will fund 90% of eligible project cost; Caltrans currently will provide 5% of the FAA amount.

Contra Costa County
Board of Supervisors

Subcommittee Report

AIRPORTS COMMITTEE **9.**

Meeting Date: 03/03/2014
Submitted For: Keith Freitas, Airports Director
Department: Airports
Referral No.:
Referral Name:
Presenter: **Contact:** Beth Lee, (925) 646-5722

Referral History:
N/A

Referral Update:
N/A

Recommendation(s)/Next Step(s):
N/A

Fiscal Impact (if any):
N/A

Attachments

Retention Efforts

Based Aircraft Totals & Changes (FAA Count for Our Airports):

Airport	2007	2010	% Change from 2007 - 2010	2011	% Change from Prior Year	2012	% Change from Prior Year	% Change Over 2007-2012 Period	2013	% Change from Prior Year	% Change Over 2007-2013 Period
Buchanan	502	387	-30%	397	2.5%	386	-3%	-30%	401	4%	-25%
Byron	105	94	-12%	86	-9.3%	83	-4%	-27%	87	5%	-21%

Based Aircraft Totals & Changes (NOT FAA Count; Aircraft noted in Multiple Locations):

Airport	2007	2010	% Change from 2007 - 2010	2011	% Change from Prior Year	2012	% Change from Prior Year	% Change Over 2007-2012 Period	2013	% Change from Prior Year	% Change Over 2007-2013 Period
Buchanan	502	446	-13%	447	0.2%	416	-7%	-21%	403	-3%	-25%
Byron	105	98	-7%	98	0.0%	111	12%	5%	107	-4%	2%

Cost Information That Pilots Focus On:

Airport	CPI Adjustment	T-Hangar Size	Monthly Rent	How Many Years of CPI Adjustments to Catch Up to Us (if our rates are frozen)*
Airport #1 -- Contra Costa County	Yes Annually	Small	$ 383.74	
		Medium	$ 533.91	
Airport #2 (L)	Yes; minimum of 1.5%	Small	$ 318.00	7+
		Small	$ 343.00	4+
		Medium	$ 423.00	9+
Airport #3 (H)	75% of annual CPI amount only every other year (odd years)	Small	$ 327.00	17+
		Medium	$ 448.00	19+
Airport #4 (T) - NON RESIDENT Rental Rates	Yes annually	Small	$ 326.74	6+
		Medium	$ 436.07	7+
Airport #4 (T) - RESIDENT Rental Rates	Yes annually	Small	$ 284.11	11+
		Medium	$ 379.19	13+
Airport #1 Contra Costa County	Yes Annually	Small	$ 258.06	N/A
Airport #2 (R)	No (only 1 increase in past 5 years of $1/month)	Small	$ 291.00	N/A
Airport #3 (N)	No; depends on amount	Small	$ 263.00	N/A
Airport #4 (T) - NON RESIDENT Rental Rates	Yes annually	Small	$ 326.74	N/A
Airport #4 (T) - RESIDENT Rental Rates	Yes annually	Small	$ 284.11	N/A

* Using the December 2013 CPI Index of 2.6% and comparison of most comparable hangars (i.e., small to small or medium to medium by size)

Contra Costa County Board of Supervisors

Subcommittee Report

AIRPORTS COMMITTEE **11.**

Meeting Date:	03/03/2014
Submitted For:	Keith Freitas, Airports Director
Department:	Airports
Referral No.:	
Referral Name:	
Presenter:	**Contact:** Beth Lee, (925) 646-5722

Referral History:

N/A

Referral Update:

N/A

Recommendation(s)/Next Step(s):

N/A

Fiscal Impact (if any):

N/A

Attachments

Infrastructure Analysis

Infrastructure Study
for the
Byron Airport

Project for:

Contra Costa County, California

Mead & Hunt
www.meadhunt.com

November 2013

Table of Contents

Appendices

1. Introduction

The Contra Costa County Airports Division is planning for development of the Byron Airport (Airport) as permitted under the Byron Airport Master Plan. As part of planning the Airport development, the existing utilities will need to be upgraded to serve the additional development areas. The Airport is currently served by a fire protection system consisting of a 3,000 gallons per minute (gpm) fire pump and a pipeline system with 20 fire hydrants. The sanitary sewer system consists of approximately 2,500 linear feet (LF) of sanitary sewer collection main, a 3,000-gallon septic tank, lift station, and drain field. The domestic water system consists of a groundwater well, chlorine feed system, 4,000-gallon storage tank and booster pump, and approximately 2,000 LF of small diameter distribution mains.

The purposes of this study are to evaluate capacity limits for the existing fire protection system, sanitary sewer system, and domestic water system to determine capacity remaining in the systems to accommodate development; identify and analyze necessary infrastructure improvements needed for development; and to prepare cost estimates and an implementation plan to upgrade the systems mentioned above for full build-out of the Byron Airport Master Plan. The Airport Layout Plan (ALP) is included in Appendix A.

In addition, a general review of the private utilities and storm drainage system at the Airport has been included in this study.

1.1 Airport History

From the Contra Costa County website:

Studies carried out by Contra Costa County in the late 1970's / early 1980's identified the need for one or more airports in the County to relieve the aircraft parking and operational pressures on Buchanan Field Airport in Concord. Continued urbanization in the western and central sections of the County made it impossible to develop a new airport in those areas. The County then focused its attention on finding a site for a new airport in the eastern part of the County. The East Contra Costa County Airport Master Plan completed in May 1986 was the third of three documents prepared as part of the East Contra Costa County Airport Site Study, the others being the Phase 1: Site Identification and Evaluation (October 1984) report and the Environmental Impact Report: East Contra Costa Airport (Draft, September 1985; responses to comments, January 1986). Preparation of an Airport Layout Plan for the Byron site and assessment of the environmental impacts of airport development at Byron were presented in the Environmental Impact Report (EIR). The EIR was reviewed by governmental agencies as well as the general public, responses to comments were prepared, and the document was subsequently certified by the County Planning Commission.

The site evaluation culminated in the County Board of Supervisors' selection of the Byron Airpark (a small privately owned airport located in the southeastern area of the County) to provide aviation facilities for the residents of East Contra Costa County. The Byron Airpark was purchased in 1986, and the new airfield constructed in the early 1990's. The new Byron Airport was opened to the public *in October 1994, replacing the Byron Airpark that occupied the northwest corner of the current airport property. The Airport is 1307 acres with the majority (814 acres) of the land reserved for Habitat Management Land for a variety of endangered and special status species of mammals and plant life.*

2. Byron Airport Master Plan Potential Development

The main goal of the 2005 Airport Master Plan (AMP) was to provide land use guidelines which satisfy future aviation demand. The 2005 AMP provides an evaluation of the Airport's aviation demand and an overview of the systematic airport development that will best meet those needs. Land use guidelines are established in the 2005 AMP for future airport functions, including general aviation, airport support, aviation-related land uses, and non-aviation land uses. The 2005 AMP categorized the potential future land development into two categories; near-term aviation-related land uses and long-term aviation-related land uses.

From the Executive Summary of the 2005 AMP, regarding development at the Airport:

- *Cargo development at Byron Airport would be expected to follow a development cycle. Large air cargo aircraft operations are unlikely in the next 10 to 15 years, and likely Airport activities in the short-term will result from trucking activity and the Airport's relationship to other airports. Feeder (or propeller) aircraft represent the most likely source of initial air cargo activity and incremental growth at the Airport, building on trucking activity.*

- *Regional economic trends will likely support aviation growth. The eastern section of Contra Costa County, in which the Airport is located, has experienced growth in residential and industrial development as population and business activity force new development outside more developed areas of the East Bay (specifically, Alameda County). This trend is expected to continue in the long-term. Diversified regional development, including office, light industrial, warehousing and logistical, and residential development would likely facilitate economic and aeronautical growth.*

- *The Bay Area's general aviation market has a long-term need for facilities. Corporate aviation has been and is expected to be one of the fastest growing general aviation market segments, and is expected to spur demand for aircraft hangar storage and for the fixed base operators that support such corporate activity.*

- *The major factors that will affect the potential development of air cargo and general aviation are external to the Airport. There is currently a low concentration of "cargo-generating" business and a low concentration of population and business relevant to general aviation, surrounding the Airport. Improvements of the regional road and highway network would also be needed.*

- *Developments on-Airport could support and enhance regional development and the potential for air cargo and general aviation. Incremental development of general aviation and specialty aviation activity at Byron Airport would attract and facilitate aviation support services useful to potential air cargo feeder operators. Incremental development of non-aeronautical property at Byron Airport* *would assist in generating sufficient local business activity that could support air cargo development, including office and light industrial parks and distribution centers.*

Boundaries on land use areas are determined by setbacks and clearances required by the Federal Aviation Administration (FAA) standards to facilitate the safe and efficient operation of the airport. Based upon the required setbacks and clearances, developable areas of property were defined.

2.1 Setbacks and Clearances

Setbacks and clearances from runways and taxiways are required for multiple reasons, most importantly to maintain safety margins that allow for safe and efficient airfield operations. Setbacks and clearances are also established to limit growth in areas where the airport may expand aeronautically in the future (such as runway expansion or instrument approaches) and for aviation related or non-aviation development.

Safety areas illustrated on the airport layout plan (ALP – See *Appendix A*) of record are typically used to determine setbacks to building and development areas. Multiple areas and zones are illustrated on an ALP that limit certain types of land use or activity in an area. These critical areas are determined by various factors such as the critical aircraft, wingspan and wingtip clearances, and visibility minimums and instrument approaches.

2.1.1 2013 Airport Layout Plan

FAA regulations and design standards specify critical area dimensions and setbacks on an ALP be based on design aircraft, instrument approach minimums and other factors detailed in various Advisory Circulars (AC). Some of the most prevalent ACs are AC 150/5300-13A: *Airport Design* and Federal Aviation Regulation Part 77: *Safe, Efficient Use, and Preservation of the Navigable Airspace*.

The ALP for Byron uses FAA guidance to determine the appropriate safety areas and critical setbacks for Byron Airport. The ALP is being updated concurrently with this Infrastructure Study, and is referred to as the '2013 ALP' in the balance of this Study. As of this writing, the 2013 ALP is in a draft state and has been reviewed and accepted by the Airport to be used as part of this Study, but has not yet been approved by the FAA. The 2013 ALP is being updated to conform to new FAA guidance on ALP preparation. Land use shown on the current ALP reflects the vision of the Airport from the approved Master Plan. Critical safety areas are detailed on the 2013 ALP.

2.2 Ultimate Land Use

The 2013 ALP set contains a Land Use Map that details future land use areas and acreages. The Land Use Map was edited using the 2005 Airport Master Plan as a guide and revised based on Airport staff input and current FAA standard for critical areas and setbacks. Land Uses are illustrated in **Exhibit 1**.

2.2.1 Land Use Designations and Calculations

Definitions for each land use:

- Airport Related Use – Land that is designated for aviation or non-aviation uses. Any non-aviation use may require FAA approval and release of land.
- Aviation Reserve – Land that is reserved for uses that would be directly related the airport and aeronautical functions.
- Aircraft Storage – Area allocated for aircraft storage hangars near the existing building area. This area is outside of the BRL.
- Aircraft Parking – Land near the existing building area that is set aside for outdoor aircraft parking. This area is between the BRL and the OFA.
- Low Intensity Use – Land that is open space but may offer potential land use in the form of agriculture, as long as it does not attract birds or other wildlife that may interfere with airport operations. These areas need to be free of structures but may offer some revenue generating use.
- Habitat Management Land – Property designated for open space.

The following table provided acreages for each land use. See Exhibit 1 for more clarification.

<table>
<tr><th>Land Use</th><th>Location</th><th>Acres</th><th>Total Acres</th></tr>
<tr><td rowspan="5">Airport Related</td><td>Northwest of Runway 12 Approach End</td><td>9.6</td><td rowspan="5">96.4</td></tr>
<tr><td>Northeast of Runway 12-30</td><td>31.8</td></tr>
<tr><td>East of Runway 12-30 and North of Runway 23 Approach End</td><td>35.0</td></tr>
<tr><td>East of Runway 23 Approach End</td><td>9.3</td></tr>
<tr><td>West Edge of Airport Property</td><td>10.7</td></tr>
<tr><td rowspan="3">Aviation Reserve</td><td>West of Runway 12 Approach End</td><td>43.0</td><td rowspan="3">69.0</td></tr>
<tr><td>West of Runway 12-30 (Existing Building Area)</td><td>15.0</td></tr>
<tr><td>North of Runway 5 Approach</td><td>11.0</td></tr>
<tr><td>Aircraft Storage</td><td>West of Runway 12-30 (Existing Building Area)</td><td colspan="2">10.5</td></tr>
<tr><td>Aircraft Parking</td><td>West of Runway 12-30 (Existing Building Area)</td><td colspan="2">9.7</td></tr>
<tr><td rowspan="2">Low Intensity</td><td>North and East of Runway 12-30</td><td>39.0</td><td rowspan="2">48.9</td></tr>
<tr><td>Runway 23 Approach – Runway Protection Zone</td><td>8.9</td></tr>
<tr><td colspan="2">Habitat Management Land</td><td colspan="2">810.6</td></tr>
</table>

Areas east of Runway 12-30 that are bisected by irrigation canals are not included in acreages for potential land use. A large irrigation canal (Byron Bethany Irrigation District 45 Canal) traverses much of the northeastern development area and a large detention basin is sited on a portion of the eastern area. These facilities and their associated setbacks further reduce the availability of developable sites within these areas. In addition, existing and proposed roads and right-of-ways are also excluded from land use calculations.

Eighteen acres east of Runway 5-23 is not considered available for major development since it is located at the extension of the runway and is currently used as a storm drainage detention basin. The detention basin may be expanded to allow for future development. Refer to Section 7 below for storm water evaluation.

2.2.2 Development Phasing

According to the 2005 Airport Master Plan, two terms of phasing development are proposed: near- and long-term. Phasing is illustrated on Exhibit 1 and only applies to areas where future potential building development is possible (Airport Related and Aviation Reserve land uses).

According to the 2005 Master Plan, the near-term planning scenario was meant to correspond a time frame from 2008-2010. However, since the near-term time frame has passed as of the date of this report, the updated near-term time frame is from 2014-2019. The near-term development area is located west of the intersection of the two runways, and is reserved for general aviation and airport support (See Exhibit 1). A total of 56.8 acres are designated for near-term development. In order to facilitate movement of ground vehicles and to maintain runway approach and safety requirements, it is recommended that Falcon Way be upgraded and extended to provide access to these areas as part of near-term development.

The 2005 Master Plan projects the long-term planning scenario from 2023-2025. However, since the near-term time frame has passed as of the date of this report without development, the updated long-term time frame is from 2020-2029. The long-term development areas are located north and east of Runway 12-30 and immediately north of Runway 5-23 (See Exhibit 1). The area designated for long-term development totals 96.7 acres.

3. Fire Protection System

3.1 Existing Fire Protection System

The existing fire protection system consists of approximately 11,000 feet of pipeline and 20 hydrants, and is supplied by a 100-horsepower (HP) fire pump which is located in a pump house on the northeast side of Runway 12-30. The Airport is required to maintain the capacity to fight the design fire which includes a total fire flow of 3,000 gpm, supplied from three hydrants flowing simultaneously at 1,000 gpm each for three hours with 20 pounds per square inch (psi) residual pressure in the main. The duration of the design fire is three hours. The minimum requirement is to provide water storage and pumping capacity for one design fire.

The existing fire pump has a design pumping capacity of 3,000 gpm. The fire protection system was designed for three hydrants flowing simultaneously for three hours with 20 psi residual pressure in the main. The fire pump is supplied by a lined fire protection pond which receives water from the Byron

Bethany Irrigation District (BBID). There is also a siphon pump station located southeast of the runway intersection that provides water from an underground 96-inch diameter pipe as a supplement to the fire water pond.

In order to provide enough water to meet the fire protection system requirements, the pond requires a minimum capacity of 540,000 gallons. The lined pond has been estimated to contain a storage capacity of approximately 750,000 gallons based on the construction record drawings. Approximately one million additional gallons of water is available from the 96-inch diameter pipe. The 96-inch diameter pipe is approximately 3,200 feet long and is a section of the BBID Canal 45, which was piped underground for development of the Airport. During irrigation season when the BBID canal is in operation, typically May through October, the pond may be refilled as needed and there is no limitation to water supply for fire protection. Outside of irrigation season, the supply of water available for fire protection is limited to the storage within the pond and 96-inch diameter pipe; however, the BBID is willing to assist the Airport in providing water for fire suppression in an extreme fire event where the pond and 96-inch diameter pipe are depleted.

Based on available storage capacity, the Airport currently has sufficient storage to fight approximately three design fires outside of irrigation season and no limit during irrigation season. The fire pump has the capacity to fight one design fire at a time, which meets current requirements.-

The Airport has been experiencing difficulties with the fire pump and has had to replace it twice in recent years. The fire pump is currently operating without any reported issues. The fire pump does not have an on-site back-up system; however, the County owns a trailered unit that can be driven to the site if the fire pump fails.

3.2 Existing Fire Protection System Capacity

The existing fire protection system was modeled using WaterCAD Version 8i developed by Bentley Systems, Inc. The WaterCAD program is a design tool used to model water supply systems and calculates how much flow is available at any hydrant or group of hydrants in the system, based on supply, pressure and flow constraints. Fire flows were simulated near the western end of Runway 12-30 because hydrants at this location are furthest from the fire pump. The modeling assumed that adequate water storage was available for the duration of the fire, and that the fire pump is performing as indicated on the manufacturer's pump curve. The results of the model confirmed that the fire protection system is capable of supplying three hydrants simultaneously with a flow of 1,000 gpm each for three hours, while maintaining a minimum of 20 psi residual pressure in the water main pipeline. The WaterCAD model report is included in Appendix C. The existing system meets the current fire protection requirements of the Contra Costa County Fire Protection District and the National Fire Protection Association.

3.3 Fire Protection System for Potential Development

3.3.1 On-Site Fire Protection System

As discussed in this section, the existing fire pump is capable of supplying water for fire protection for the near-term and long-term future development. The fire protection system extensions required to service the near-term and long-term future development connects to the existing system and is shown on the Utilities Plan in Appendix D. The near-term and long-term fire protection improvements include approximately 9,100 feet and 12,600 feet of 12-inch pipeline, respectively, to serve the development areas. The pipeline extensions would provide a looped system to maintain pressure in the pipeline, extend fire protection to all areas, and add flexibility of water delivery if sections need to be isolated for maintenance.

The fire flow requirements are based on the 2010 California Fire Code (Part 9 of the Title 24, California Code of Regulations (CCR). Future code updates may require changes to the fire flow requirements.

The future fire protection system was modeled using WaterCAD to verify adequate volumes and pressure of water for fire protection and to verify pipe sizing for the future pipelines. The fire protection pipeline was assumed to be 12-inch PVC, which matches the existing system pipes, and fire hydrants were modeled at maximum 500-foot spacing. The model simulated the fire along Runway 5-23 because this is the most remote part of the future system and is not fully looped. The results of the model concluded that the existing fire pump is capable of supplying water to three hydrants simultaneously with a flow of 1,000 gpm each, while maintaining a minimum of 20 psi residual pressure in the water main pipeline for the near-term and long-term developed condition, as shown on the Utilities Plan.

3.3.2 Discovery Bay Water System Connection

The Discovery Bay Community Services District (CSD) completed their water system Master Plan update in January 2012. Extending water service to the Airport was not anticipated in the Plan; however, the CSD does have capacity in their system to provide water for domestic and fire protection uses. In discussions with the CSD, sufficient capacity is currently available and the CSD would be open to discussions on serving the Airport. However, it should be noted that the CSD's obligations may change, so there is no guarantee that there will be capacity in the future if/when the Airport would want to connect to the CSD system. In addition, since the Airport and pipeline route are outside of Discovery Bay's service boundaries, the connection would have to be approved by the Contra Costa Local Agency Formation Commission (LAFCO). It is not known at this time if local residents or property owners along the pipeline route would support or oppose the project.

The assumption made for cost estimating purposes is that the Airport would be responsible for all costs associated with the connection to the Discovery Bay System, which is likely to include a water storage tank, pipelines, a water booster pump station, and easements. Refer to Appendix E for a map of a proposed alignment for a utility connection to Discovery Bay, and Appendix F for an on-site Utility Plan with a Discovery Bay connection. As shown on the Utility Plan, the domestic water and fire protection are combined in a single water main.

3.3.3 Byron Water System Connection

The community of Byron does not have a domestic water system. The residents primarily rely on individual domestic water wells. There is a small community water system with two wells located along Main Street, but the system has insufficient capacity to provide water to the Airport.

3.4 Opinion of Probable Construction Costs (OPCC)

A comparative opinion of probable construction costs (OPCC) was developed for the fire protection system improvements required to support future development. The OPCC only included the major construction components for each scenario. Unit costs were estimated using the RS Means Heavy Construction Cost Data Manual 2013, Contractor bids for related work, and discussions with contractors/suppliers.

3.4.1 On-Site Improvements

An OPCC was prepared for extending the existing fire protection system to the near-term and long-term potential development areas. Since the existing fire pond and pump have the capacity to support the development areas, only pipeline extensions were required for the future areas. The OPCC's for the near-term and long-term development are provided below.

The near-term developments include extensions of the fire protection system to serve the development areas along the west side of Runway 12-30.

Near-Term Development On-Site Fire Protection Improvements

Description	Quantity	Unit Cost	Cost
12-Inch PVC Pipe	7,100 LF	$100	$710,000
12-Inch Gate Valve	16 EA	$2,500	$40,000
Fire Hydrant	16 EA	$5,700	$91,200
		Subtotal:	$841,200
		Contingency (25%):	$210,300
		Rounded Total:	***$1,050,000***

The long-term developments include extensions of the fire protection system to serve the development areas along the northeast side of Runway 12-30 and immediately north of Runway 5-23 to provide a looped system. The long-term improvements assume that the near-term improvements have already been constructed.

Long-Term Development On-Site Fire Protection Improvements

Description	Quantity	Unit Cost	Cost
12-Inch PVC Pipe	14,600 LF	$100	$1,460,000
12-Inch Gate Valve	12 EA	$2,500	$30,000
Fire Hydrant	30 EA	$5,700	$171,000
		Subtotal:	$1,661,000
		Contingency (25%):	$415,250
		Rounded Total:	***$2,080,000***

3.4.2 Connection to Discovery Bay

An OPCC was prepared connecting to the Discovery Bay water system for fire protection for the existing developed areas and the near-term and long-term potential development areas. The alternative included a transmission main from Discovery Bay, a water storage tank, and a booster pump station. The costs for the connection to Discover Bay would be included in the near-term development costs, and the long-term development OPCC only included on-site pipeline extensions to the development area since it is assumed that the water transmission from Discovery Bay, booster pump station, and water storage tank were already constructed for the near-term development area. The OPCC's for the near-term and long-term development are provided below. Since the size of a water transmission pipeline for a joint-use of fire protection and domestic water is governed by the fire flow demand, this alternative also includes providing water service for domestic and irrigation uses.

Near-Term Development Fire Protection Connection to Discovery Bay

Description	Quantity	Unit Cost	Cost
8-Inch PVC Pipe	26,000 LF	$80	$2,080,000
12-Inch PVC Pipe	7,100 LF	$100	$710,000
8-Inch Gate Valve	22 EA	$1,500	$33,000
12-Inch Gate Valve	16 EA	$2,500	$40,000
Fire Hydrant	16 EA	$5,700	$91,200
Booster Pump Station	1 EA	$120,000	$120,000
600,000 Gallon Water Storage Tank	1 EA	$750,000	$750,000
Utility Easement	12 AC	$8,000	$96,000
		Subtotal:	$3,920,200
		Contingency (25%):	$980,050
		Rounded Total:	**$4,900,000**

Long-Term Development Fire Protection Connection to Discovery Bay

Description	Quantity	Unit Cost	Cost
12-Inch PVC Pipe	14,600 LF	$100	$1,460,000
12-Inch Gate Valve	12 EA	$2,500	$30,000
Fire Hydrant	30 EA	$5,700	$171,000
		Subtotal:	$1,661,000
		Contingency (25%):	$415,250
		Rounded Total:	***$2,080,000***

4. Sanitary Sewer System

4.1 Existing Septic System

The Airport's sewer service is currently provided by approximately 2,500 LF of sanitary sewer collection mains and a 3,000-gallon underground septic tank with a lift station to a leach field that is located southwest of the main aircraft ramp. The lift station includes two 2-HP Hydromatic Submersible Sewage Grinder Pumps (model SPGL200M2-2) with a 46 gpm maximum capacity each.

4.1.1 Soil Application Rates

Based on the United States Department of Agriculture Natural Resources Conservation Service soils map, the soil in the Airport development area is typically Linne Clay Loam (LbD), San Ysidro Loam (Sc), and Solano Loam (Sk). The permeability of these soil types range from 0.2-0.6, 0.6-2.0, and 0.6-2.0 inches per hour, respectively. The geotechnical investigations conducted as part of the Byron Airport Engineer's Design Report showed near surface soil conditions of silty clay and sandy clay along Runway 12-30 which would correlate with an infiltration rate of 0.6. For this analysis, a conservative infiltration rate of 0.6 inches per hour was assumed, which equates to a percolation rate of 100 minutes per inch and a soil loading rate of 0.2 gallons per square feet per day[1].

4.2 Existing Septic System Capacity and Current Demand

The existing septic system capacity is limited to the capacity of the leach field. As shown in the as-built plans, the septic system leach field is approximately 8,600 square feet. With a soil loading rate of 0.2, the leach field has a capacity of 1,720 gallons per day (gpd).

The current septic system demand is low due to the few water users. The main water uses at the Airport include 7 sinks, 5 toilets, 3 urinals, and the aircraft wash rack. There are no restrooms located inside the Byron Jet Center; however, there are stubbed utilities for future connection to water and sewer service.

[1] Percolation Rates and Soil Loading Rates are from Appendix 2 of the Contra Costa Health Services Health Officer Regulations Chapter 420-6.

In order to estimate the peak sewage flow, the number of aircraft based at the Airport (112 aircraft) was multiplied by the estimated sewage flow for a service station (10 gpd[2]) and then multiplied by a factor of 60% since all aircraft are not expected to be maintained during a peak day. Therefore, the estimated peak daily sewage flow for the existing conditions is 672 gallons, or approximately 39% of the capacity.

The existing system does have capacity to support future development and can handle an additional 1,048 gpd. The extent of development that the system can handle would depend on the type of development. For example, restroom facilities require approximately 5 gallons per person per day, so the existing system has sufficient capacity to support approximately 210 additional users per day.

4.3 Sanitary Sewer System for Future Development

The septic system analysis was based upon design flow criteria stated in the Central Contra Costa Sanitary District's Collection System Master Plan Update. For this analysis, the septic system conservatively assumed the entire developable area would be converted to Industrial uses. The base wastewater flow (BWF) used in the analysis was 1,000 gallons per day (gpd) per acre. The table below summarizes the short and long term anticipated wastewater generation rates.

Land Use Category	Area (acres)	Wastewater Flows (gpd)
Short-term development	57.6	57,600
Long-term development	96.7	96,700
Total	**154.3**	**154,300**

4.3.1 On-Site Expanded Sewage Leach Fields

The near-term development is estimated to require a minimum 44,400 gallon septic tank and 6.6 acres of leach field. The long-term development is estimated to require an additional minimum 73,700 gallon septic tank and 11.1 acres of leach field. Large leach fields of these sizes are typically not used due to the high initial construction and operations and maintenance cost, so several smaller leach fields would be required to support the development.

The on-site handling of the potential near-term and long-term development is not feasible at a centralized location given limitations on leach field sizing. However, septic systems with leach fields would be feasible as separate systems at each development site. Requiring each development to construct individual septic systems would eliminate the need for sanitary sewer piping within the Airport, but would reduce developable acreage, increase permitting requirements, and increase construction and operations and maintenance (O&M) costs for the developments.

[2] Estimated Quantities of Sewage Flow from Appendix 3 of the Contra Costa Health Services Health Officer Regulations Chapter 420-6.

4.3.2 On-Site Sewage Treatment

On-site treatment is feasible with a package wastewater treatment plant. There are a number of manufacturers of packaged wastewater treatment plants that would meet the Airport's treatment needs for both short term and long term development. The treatment plant would be permitted through the Regional Water Quality Control Board (RWQCB) General Order 97-10. The treatment plants are available in both above ground and partially underground models and with a wide range of flow rates. A package wastewater treatment plant would include the following components and processes:

- Influent equalization chamber
- Sludge holding chamber/aerobic digester
- Aeration chamber
- Clarifier
- Filter Equipment (for irrigation discharges)
- UV Disinfection

One issue with on-site treatment is the disposal of the treated effluent. The effluent can be treated to meet California Title 22 requirements which would allow for the treated effluent to be used for landscape irrigation.

Permitting a new treatment plant is a lengthy process as the RWQCB prefers regionalization of sewage treatment. One factor that will work in favor of permitting the use of a package treatment plant is that the Airport is not in proximity to a regional wastewater treatment facility that has sufficient capacity; therefore the RWQCB would be more likely to approve a new treatment plant.

A package sewage treatment plant does require ongoing O&M costs, primarily for labor and electricity usage. The Airport could perform O&M wastewater treatment activities with the proper certifications or could contract for the O&M services. The RWQCB requires regular reporting of the plant operation. For planning purposes, we estimate that the plant would require the following O&M expenses:

1. Electricity - 25 HP x 0.735 KW/HP x 24 hrs/day x 365 days/year x $0.12/KWH = $19,300/year
2. Labor (operation requires 1 man hr/day) - $40/hour x 365 hours/year = $14,600/year
3. Replacement (typically 2% of equipment cost annually) - $375,000 x 2% = $7,500/year
4. Chemicals - $0 for UV disinfection

   Total O&M cost is estimated at $41,400 per year

4.3.3 Discovery Bay Sewer System Connection

The Town of Discovery Bay CSD was formed in July 1998 with the responsibility to provide water and wastewater services to the Discovery Bay community. The CSD recently completed their sanitary sewer Master Plan in February 2012 and providing sewage service to the Airport was not anticipated in the Plan. In discussions with the CSD, sufficient capacity is available and the CSD would be open to discussions on serving the Airport. Since the Airport and sewage forcemain route are outside of Discovery Bay's service boundaries, the connection would have to be approved by the Contra Costa LAFCO. It is not known at this time if local residents or property owners along the pipeline route would support or oppose the project.

The assumption made for cost estimating purposes is that the Airport would be responsible for all costs associated with the connection to the Discovery Bay System, which is likely to include modifications to the existing sewage lift station (or a new lift station) and a forcemain to Discovery Bay. There may also be a connection fee to join the CSD; however, a connection fee cannot be negotiated until a firm plan and construction timeline is developed. Refer to Appendix E for a map of a proposed alignment for a potential connection to Discovery Bay, and Appendix F for an on-site Utility Plan with a Discovery Bay connection.

4.3.4 Byron Sewer System Connection

The Byron Sanitary District operates the Waste Water Treatment Facility (WWTF) for the community of Byron. The WWTF is permitted for a sewage flow of 96,000 gpd and is currently operated at approximately 56,000 gpd. The District has indicated that the Airport could connect to the WWTF, but a major expansion would be required to handle the estimated flow from the full development of the Airport. The WWTF needs to retain sufficient spare capacity to allow for increased flows from the Byron community and the fully developed sewage flow from the Airport exceeds the remaining WWTF treatment capacity.

Since the Airport and sanitary sewer forcemain route are outside of Byron’s service boundaries, the connection would have to be approved by the Contra Costa LAFCO.

4.4 Opinion of Probable Construction Costs (OPCC)

A comparative OPCC was developed for the potential improvements required to support future development. The OPCC only included the major construction components for each scenario. Unit costs were estimated using the RS Means Heavy Construction Cost Data Manual 2013, Contractor bids for related work, and discussions with contractors/suppliers.

4.4.1 On-Site Expanded Sewage Leach Fields

An OPCC was prepared for providing sewer service to the near-term and long-term potential development areas. Since the existing sewer lift station and leach field cannot support the full future development, the OPCC includes a sewer pipeline and a sewer lift station. A separate sewer system would be required for the near-term and long-term development areas due to the size of the leach field. The OPCC’s for the near-term and long-term development are provided below. The long-term improvements assume that the near-term improvements have already been constructed.

Near-Term Development On-Site Expanded Sewage Leach Fields

Description	Quantity	Unit Cost	Cost
8-Inch PVC Pipe	3,600 LF	$50	$180,000
4-Foot Sewer Manholes	9 EA	$3,200	$28,800
50,000 Gallon Tank	1 EA	$75,000	$75,000
Leach Field (total acreage)	6.6 AC	$250,000	$1,650,000
Sewer Lift Station	1 EA	$80,000	$80,000
		Subtotal:	$2,013,800
		Contingency (25%):	$503,450
		Rounded Total:	***$2,520,000***

Long-Term Development On-Site Expanded Sewage Leach Fields

Description	Quantity	Unit Cost	Cost
8-Inch PVC Pipe	11,100 LF	$50	$555,000
4-Foot Sewer Manholes	28 EA	$3,200	$89,600
75,000 Gallon Tank	1 EA	$110,000	$110,000
Leach Field (total acreage)	11.1 AC	$250,000	$2,775,000
Sewer Lift Station	1 EA	$80,000	$80,000
		Subtotal:	$3,609,600
		Contingency (25%):	$902,400
		Rounded Total:	***$4,510,000***

4.4.2 On-Site Sewage Treatment

An OPCC was prepared for providing sewer service for the near-term and long-term potential development areas. Since the existing sewer lift station cannot support the full future development, the OPCC includes a sewer pipeline and a sewer lift station. The costs include a budgetary estimate of the package wastewater treatment plant required for both the short-term and long-term development. However, it is recommended that the Airport install the package wastewater treatment plant for the full build-out (near-term plus long-term development) initially due to permitting and site constraints. Constructing a near-term only package treatment plant would only be recommended if the long-term development were determined to be indefinitely delayed (beyond the long-term time frame) behind the near-term development. The OPCC's for the near-term and long-term development are provided below. The long-term improvements assume that the near-term improvements have already been constructed.

Near-Term Development On-Site Sewage Treatment (Smaller Treatment Plant)

Description	Quantity	Unit Cost	Cost
8-Inch PVC Pipe	3,600 LF	$50	$180,000
4-Foot Sewer Manholes	9 EA	$3,200	$28,800
Site Preparation	1 EA	$120,000	$120,000
Treatment Plant	1 EA	$425,000	$425,000
Sewer Lift Station	1 EA	$80,000	$80,000
Effluent Irrigation Piping	2,000 LF	$25	$50,000
		Subtotal:	$883,800
		Contingency (25%):	$220,950
		Rounded Total:	***$1,100,000***

The treatment plant required for full build-out development is recommended to be installed with the near-term development, which would add $595,000 to the near-term cost for a total of **$1,695,000.**

Long-Term Development On-Site Sewage Treatment

Description	Quantity	Unit Cost	Cost
8-Inch PVC Pipe	11,100 LF	$50	$555,000
4-Foot Sewer Manholes	28 EA	$3,200	$89,600
Site Preparation	1 EA	$120,000	$120,000
Treatment Plant	1 EA	$900,000	$900,000
Sewer Lift Station	1 EA	$80,000	$80,000
Effluent Irrigation Piping	2,000 LF	$25	$50,000
		Subtotal:	$1,794,600
		Contingency (25%):	$448,650
		Rounded Total:	***$2,240,000***

The long-term development costs are reduced by $1,375,000 to **$865,000** if the full build-out treatment plant required is constructed as part of the near-term development. The long-term costs would include pipe extensions to connect to the long-term development areas.

4.4.3 Discovery Bay Sewer System Connection

An OPCC was prepared for delivering sewage flow to Discovery Bay for the existing developed areas and the near-term and long-term potential development areas. The alternative includes modifications to the existing sewer lift station and a forcemain to Discovery Bay with capacity for the near-term and long-term development. The OPCC does not include any connection fees that may be required by Discovery Bay, or any allowances for obtaining utility easements or environmental mitigation. The OPCC is provided below.

Near-Term Development Discovery Bay Sewer System Connection

Description	Quantity	Unit Cost	Cost
8-Inch PVC Pipe (On-Site)	3,600 LF	$50	$180,000
4-Inch PVC Pipe (to Discovery Bay)	26,000 LF	$35	$910,000
4-Foot Sewer Manholes (On-Site)	9 EA	$3,200	$28,800
Sewer Lift Station	1 EA	$150,000	$150,000
Utility Easements	12 AC	$8,000	$96,000
		Subtotal:	$1,364,800
		Contingency (25%):	$341,200
		Rounded Total:	***$1,710,000***

Long-Term Development Discovery Bay Sewer System Connection

Description	Quantity	Unit Cost	Cost
8-Inch PVC Pipe (On-Site)	11,100 LF	$50	$555,000
4-Foot Sewer Manholes (On-Site)	28 EA	$3,200	$89,600
		Subtotal:	$644,600
		Contingency (25%):	$161,150
		Rounded Total:	***$810,000***

5. Domestic Water System

The domestic water system analysis was based upon design flow criteria stated in the Central Contra Costa Sanitary District's Collection System Master Plan Update. Typically, sanitary sewer design flow is approximately 70% of the domestic water design flow. However, since the domestic water design flow usually includes irrigation, minor losses, and fire protection (fire protection is a separate service for the Airport), it was concluded that a 1:1 ratio between domestic water and sanitary sewer design flows would be appropriate.

For this analysis, the domestic water system conservatively assumed the entire developable area would be converted to Industrial uses. The design flow used in the analysis was 1,000 gpd per acre.

5.1 Existing Domestic Water System

The existing domestic water system consists of a groundwater well with a 4,000 gallon holding tank. The domestic water system includes a booster pump and chlorination system. The domestic water system is non-potable and is not used for fire protection.

The groundwater well was drilled and installed by Dejesus Pump and Well Drilling, Inc. (Dejesus Pump) in September 1994. The well is 200 feet deep and consists of a 6-inch diameter plastic casing placed inside a 12.25-inch diameter bore hole. The well casing is screened from 50-70 feet and 180-200 feet below ground surface, with the remaining casing blank. The annular space in the upper 50 feet was filled with cement and the remaining 150 feet was filled with 0.25 inch gravel. The Well Completion Report is included in Appendix G.

The domestic water system includes a 2-inch diameter pipeline extending from the well to the northwest, parallel to the taxiway and past the hangars to the Byron Jet Center. The existing water system pipeline is shown on the Utilities Plan in Appendix D.

5.2 Existing Domestic Water System Capacity

The groundwater well production has significantly decreased since it was developed, and the County estimates it pumps approximately 40-60 gallons per hour. There have been instances where a faucet was accidentally left on or a toilet continued to run causing the tank to drawdown and the well pump to run continuously. The Airport has had to fill the tank by hauling water from off-site sources. In addition, the Airport has experienced times when the groundwater well was not producing any water because the aquifer was dry due to a drought.

The existing domestic water system capacity was based on the California Department of Public Health regulations, specifically Section §64554 of the California Waterworks Standards (CWS) Title 22, Chapter 16, California Code of Regulations, CCR. The CWS states that the system shall meet at least 4 hours of peak hourly demand (PHD) through source supply, storage, and emergency source connections. The PHD of the existing system is conservatively 520 gallons per hour, based upon the area of the existing facilities. At current water demands, the tank will deliver 2,080 gallons during four hours of PHD. The supply to the tank, based on the well pump estimates, will fill 160 gallons in 4 hours. Thus, the current operational storage volume is 1,920 gallons (2,080 gallons minus 160 gallons). Since the existing domestic water system utilizes a 4,000 gallon tank, the current water system is at approximately 48% capacity.

The existing domestic water tank has capacity to support future development and can provide an additional 2,080 gallons of water over a 4-hour period of peak hourly demand, or approximately 560 gallons per hour, provided that there is an adequate supply from the well. The extent of development the system can handle would depend on the type of development at the Airport.

5.3 Domestic Water System for Potential Development

The development of the Airport would require a significant amount of domestic water, which would need to be potable to support the various users. Based on the areas reserved for potential development, the water design flow would be 57,600 gpd and 96,700 gpd for near-term and long-term development, respectively, based on an industrial demand of 1,000 gpd of developable area. The full build-out demand of water for domestic uses is projected to be 154,300 gpd.

5.3.1 On-Site Water System

Based on a review of nearby groundwater wells and conversations with Dejesus Pump, there is a low probability of locating a groundwater source in the area with the supply and water quality needed to support the future development. The stratigraphy in the area changes quickly over a short area, so the presence of a quality aquifer similar to the supply for the nearby Discovery Bay wells is not likely. Water quality tests taken at the location of the existing well prior to development indicated that the water contains about 13,000 mg/l of total dissolved solids, and water of this high concentration is considered not drinkable. A potential location for a water source could be near the Byron Hot Springs, but there is also a high possibility for salt in this source. Another location for a new well may be the area north of Runway 12-30 towards Armstrong Road instead of the current location to the west of the intersection of the two runways.

To determine the availability of groundwater to supply the development at the Airport, a few test wells should be drilled as part of the decision process on how to move forward on water supply. Test well locations need to be based on a review of nearby groundwater wells. The test wells would be pumped to establish the reliable quantity of water available and also tested for water quality to establish the treatment requirements needed to treat the water for potable uses.

The groundwater aquifers in the area are expected to be low yielding (approximately 10 gpm), so more than one groundwater well would likely be required to provide adequate water for the future development. The build-out demand for domestic water is approximately 110 gpm. However, for cost estimating purposes, groundwater conditions supporting a yield of approximately 40 gpm was assumed and four wells were included in the OPCC (two well for near-term and two well for long-term development). It should be noted that if a high yielding aquifer is not located, constructing a series of multiple low-yielding wells (5 or more) is not cost effective and another source of water should be considered.

If on-site water sources are identified, an option for water treatment would be to install a Z-Box Packaged Treatment Plant manufactured by GE. The GE treatment plants are pre-engineered systems that are cost effective and compact solutions for potable water treatment. The packaged system uses an ultrafiltration membrane which effectively blocks particles, bacteria, viruses and cysts from water supplies. The system was designed with an expandable setup, so the system can be installed with a single membrane tank (up to 100,000 gpd capacity) for the near-term development, and expanded with an additional membrane tank for the long-term development. The Z-Box S Packaged Plant has a maximum capacity of 400,000 gpd, so it has the capability to be expanded beyond the expected near-term and long-term development needs. The Z-Box S Packaged Plant with two membrane tanks (200,000 gpd capacity) would require a space approximately 16-feet long by 8-feet wide, and approximately 6-feet tall. The Z-Box S Packaged Plant is included in the OPCC for on-site water improvements below. However, it should be noted that the Z-Box Packaged Treatment Plant will require continual O&M activities. For planning purposes, we estimate that the plant would require the following O&M expenses:

1. Electricity - 20 HP x 0.735 KW/HP x 24 hrs/day x 365 days/year x $0.12/KWH = $15,400/year
2. Labor - (operation requires 1 man/hr/day) $40/hour x 365 hours/year = $14,600/year
3. Replacement - (typically 10% of membrane replacement cost) $25,000 x 2% = $2,500/year
4. Chemicals - $0 for UV disinfection

    Total O&M cost is estimated at $32,500 per year

5.3.2 Discovery Bay Water System Connection

The Discovery Bay CSD recently completed their water services Master Plan in 2012 and an Airport connection was not anticipated in the Plans; however, the facilities do have capacity to provide water for domestic and fire protection uses. It should be noted that the capacity may not be available in the future, depending on development within the CSD boundaries and timing of Airport development.

For cost estimating purposes, it was assumed that the Airport would be responsible for all costs associated with the connection to the Discovery Bay System, which is likely to include a water storage tank, pipelines, and a water booster pump station. Discovery Bay may also charge a connection fee for connecting to the system. A budgetary cost estimate for the fee is not available and would be negotiated at the time of application to the CSD. The connection would have to be approved by the Contra Costa LAFCO, as described above under the fire protection discussion. Refer to Appendix E for a map of a proposed alignment for a utility connection to Discovery Bay.

5.3.3 Byron Bethany Irrigation District Water Supply

The Byron Bethany Irrigation District (BBID) provides untreated water to the Byron area from March to October, dependent upon irrigation demands. The BBID has indicated they have the ability to supply water to the Airport year-round, and is serving the Mountain House development in a similar arrangement. BBID owns a 20-million-gallon per day (MGD) pumping plant along the California Aqueduct which pumps water to the Mountain House water treatment plant through a water main. The water treatment plant is currently operating at 15 MGD, with full build-out of 20 MGD. The pumps within the pumping plant could be improved by including a variable frequency drive, or potentially installing a new small pump along with connecting piping and valving to supply the Airport. The BBID pumping plant is located approximately 2 miles from the Airport. The water would require treatment from a packaged water treatment plant such as the Z-Box system described above.

Two options are available to convey water from BBID to the Airport: (1) utilize the existing irrigation canal, or (2) construct a pipeline. The use of BBID irrigation water for potable uses would require a sanitary survey and would have to be approved by the State Department of Health Services (DHS). Since the open canal has the potential for contamination from surface runoff, grazing livestock, or vandalism, it can be foreseen that the DHS would not be favorable to this alternative. Therefore, this alternative will include a new buried pipeline to deliver water to the Airport. Refer to Appendix H for a map of a proposed alignment for a water conveyance facility to the Airport from the BBID pumping plant

BBID water would require treatment for potable uses. The Z-Box packaged treatment plant discussed above would be required to treat the water for potable use. The treatment plant could be operated and maintained by the Airport, or the BBID could operate the treatment facility. In addition, the water system would require a booster pump and water storage tank. The water storage tank would be sized at 150,000 gallons, which is approximately the average day demand at full build-out development.

5.3.4 Combination Domestic Water Supply and Fire Protection

A permanent water supply connection to BBID or Discovery Bay would allow the Airport to utilize the supply for both domestic uses and fire protection and eliminate the need for the fire pond and fire pump.

Utilizing water from Discovery Bay for fire protection in addition to domestic uses is feasible. The domestic water and fire protection water could utilize a common pipe, similar to municipal water systems because the water is treated by Discovery Bay.

A storage tank and booster pump station with back-up redundant pump would need to be sized to provide the flows and volume of water required for firefighting in addition to the domestic water requirements. The water storage tank would require a storage volume of 600,000 gallons and the booster pump station would need a capacity of 3,110 gpm. The water system is required to have sufficient capacity to deliver the fire flow and the domestic uses simultaneously, 3,000 gpm for fire flow and 110 gpm for domestic uses. The water storage tank would have several days of water storage under normal usage conditions. Chlorine may need to be added to the water storage tank to maintain the minimum level required for disinfection.

Utilizing water from a BBID domestic water pipeline for both domestic water supply and fire protection would be feasible, but more expensive. The additional supply required for fire protection would require more extensive pump upgrades in the BBID pump station.

The fire protection system would continue to utilize a separate pipeline to avoid having to treat the water used for fire protection. A common system for both fire protection and domestic water uses would require sizing the treatment plant to accommodate the fire flows at 3,000 gpm, which would be a significantly more expensive plant. A common system would also limit the available water for firefighting to the treatment plant's capacity and storage volume. Currently, there is no limit on available water during irrigation season, and arrangements can be made with BBID for supplying water during the off-season.

Utilizing a new BBID supply for both fire protection and domestic supply would require the following:

- Significant upgrades to the BBID pump station
- Two water storage tanks for fire protection and treated domestic water
- Two booster pump stations for fire protection and domestic water
- Separate pipelines

5.4 Opinion of Probable Construction Costs (OPCC)

A comparative OPCC was developed for the potential improvements required to support future development. The OPCC only included the major construction components for each scenario. Unit costs were estimated using the RS Means Heavy Construction Cost Data Manual 2013, Contractor bids for related work, and discussions with contractors/suppliers.

5.4.1 On-Site Improvements

An OPCC was prepared for providing domestic water service to the near-term and long-term potential development areas. Since the existing domestic water well and tank cannot support the near-term or long-term future development, the OPCC includes the drilling of a new well, a new storage tank, a new water treatment facility, and water pipeline to the on-site development areas. A separate water system was included to support the long-term development areas. The OPCC's for the near-term and long-term development are provided below. The long-term improvements assume that the near-term improvements have already been constructed.

Near-Term Development On-Site Domestic Water Improvements

Description	Quantity	Unit Cost	Cost
Drill Water Well	2 EA	$350,000	$700,000
25,000 Gallon Storage Tank	1 EA	$30,000	$30,000
Water Treatment Facility	1 EA	$200,000	$200,000
4-Inch Diameter PVC Pipe	3,200 LF	$35	$112,000
4-Inch Valves	6 EA	$700	$4,200
		Subtotal:	$1,046,200
		Contingency (25%):	$261,550
		Rounded Total:	***$1,310,000***

Long-Term Development On-Site Domestic Water Improvements

Description	Quantity	Unit Cost	Cost
Drill Water Well	2 EA	$350,000	$700,000
40,000 Gallon Storage Tank	1 EA	$40,000	$40,000
Water Treatment Facility Add-on	1 EA	$100,000	$100,000
4-Inch Diameter PVC Pipe	11,400 LF	$35	$399,000
4-Inch Diameter Valves	24	$700	$16,800
		Subtotal:	$1,255,800
		Contingency (25%):	$313,950
		Rounded Total:	***$1,570,000***

The well cost estimate takes into account the probability that test wells and additional measures would need to be included to site and develop the well to produce and adequate water supply. The cost estimate includes the following:

- Test wells and test pumping to locate optimum well site
- Well development
- Well casing, piping, pump and motor, and connection to water system
- Electrical supply and controls

5.4.2 Connection to Discover Bay

An OPCC was prepared for providing water for domestic uses from Discovery Bay for the existing developed areas and the near-term and long-term potential development areas. This scenario assumes that fire protection would be handled by the on-site system. The alternative included a transmission main from Discovery Bay and on-site booster pump station, water storage tank, and piping. The OPCC does not include any connection fees that may be required by Discovery Bay, or any allowances for environmental mitigation. The OPCC's for the Discovery Bay connection, booster pump station, and water storage tank would need to be constructed in the near-term.

Near-Term Development Domestic Water Connection to Discovery Bay

Description	Quantity	Unit Cost	Cost
8-Inch Diameter C900 PVC Pipe	26,000 LF	$80	$2,080,000
8-Inch Diameter Valves	55 EA	$1500	$82,500
Booster Pump Station	1 EA	$120,000	$120,000
150,000 Gallon Water Storage tank	1 EA	$160,000	$160,000
Utility Easements	12 AC	$8,000	$96,000
4-Inch Diameter PVC Pipe (On-Site)	3,200 LF	$35	$112,000
4-Inch Valves (On-Site)	6 EA	$700	$4,200
		Subtotal:	$2,654,700
		Contingency (25%):	$663,675
		Rounded Total:	***$3,320,000***

Long-Term Development Domestic Water Connection to Discovery Bay

Description	Quantity	Unit Cost	Cost
4-Inch Diameter PVC Pipe (On-Site)	11,400 LF	$35	$399,000
4-Inch Valves (On-Site)	24 EA	$700	$16,800
		Subtotal:	$415,800
		Contingency (25%):	$103,950
		Rounded Total:	***$520,000***

5.4.1 Connection to BBID

An OPCC was prepared for providing water for domestic uses from BBID for the existing developed areas and the near-term and long-term potential development areas. This scenario assumes that fire protection would be handled by the existing on-site system. The alternative included a transmission main from BBID and on-site pipe extensions to the potential development areas. The OPCC does not include any connection fees that may be required by BBID, or any allowances for obtaining utility easements or environmental mitigation. The pipeline route is located primarily on Airport property or within BBID property. The pipeline route located on Airport property is largely within the areas designated as the Biologically Sensitive Area and would need to be permitted. It is anticipated that the water transmission from BBID, package water treatment plant, storage tank, and booster pump station would be constructed for the near-term development area. The OPCCs for connection to BBID are provided below. The BBID connection, booster pump station, and water storage tank would need to be constructed for the near-term development.

Near-Term Development Domestic Water Connection to BBID

Description	Quantity	Unit Cost	Cost
8-Inch Diameter C900 PVC pipe	7,500 LF	$80	$600,000
8-Inch Diameter Valves	15 LF	$700	$10,500
150,000 Gallon Water Storage Tank	1 EA	$160,000	$160,000
Booster Pump Station	1 EA	$120,000	$120,000
Water Treatment Facility	1 EA	$200,000	$200,000
Site Preparation Work	1 EA	$80,000	$80,000
BBID Pumping Plant Improvements	1 EA	$75,000	$75,000
4-Inch Diameter PVC Pipe (On-Site)	3,200 LF	$35	$112,000
4-Inch Valves (On-Site)	6 EA	$700	$4,200
		Subtotal:	$1,361,700
		Contingency (25%):	$340,425
		Rounded Total:	***$1,700,000***

Long-Term Development Domestic Water Connection to BBID

Description	Quantity	Unit Cost	Cost
4-Inch Diameter PVC Pipe (On-Site)	11,400 LF	$35	$399,000
4-Inch Valves (On-Site)	24 EA	$700	$16,800
		Subtotal:	$415,800
		Contingency (25%):	$103,950
		Rounded Total:	***$520,000***

6. Private Utilities

Telephone and electric service is provided to the Airport. Both of these utilities are routed to the Airport from the intersection of Holey Road and Byron Hot Springs Road. The utility lines cross beneath the runway and taxiway to the electrical room located inside the Fixed Base Operator Hangar. No television or natural gas services are provided to the airport; however, several empty conduits are installed under the runway and taxiway to allow for future utilities.

6.1 Electrical Service

The electrical service to the Airport is provided by the Pacific Gas and Electric Company (PG&E). The existing service is delivered by a 12-kilovolt line, which is sufficient to supply power to the future development at the Airport discussed in this report.

6.2 Natural Gas Service

There is currently no natural gas service provided to the Airport. However, there is a PG&E high pressure transmission line that crosses Runway 5-23. PG&E doesn't foresee any issues with extending natural gas service to the Airport; however, the final determination cannot be made until a formal service request has been submitted.

6.3 Communication Service

The communication service to the Airport is currently provided by AT&T through underground lines. Telecommunications, video/television, and data services can be added to the Airport to serve future development. There is an existing fiber-optic line along Byron Highway, which can be extended to the Airport's demarcation point and then wired throughout the Airport property to the individual users. The Airport would have to submit a service request to AT&T describing the types of services to be added at the Airport property.

6.4 State Route 239 TriLink Program

First identified in 1959, SR-239 is a legislatively approved, but unconstructed route in the California state highway system. SR-239 is a potential multimodal link between SR-4 near Brentwood and I-205 west of Tracy in San Joaquin County. The route has not been adopted by the California Transportation Commission; however, Contra Costa County was awarded $14 million for initial study and planning under SAFETEA-LU in 2005. Administration of the study, now called TriLink, was transferred to the Contra Costa Transportation Authority in January 2012. The Parsons Transportation Group is working on the project and is performing a study to identify ways to improve transportation in the area.

The TriLink project study currently includes a connector link to the Byron Airport, which could improve access to the airport and potential future airport development. In addition, the TriLink project includes utility planning, which could potentially be extended to serve the airport. However, at this time the TriLink feasibility analysis is too premature to include in the report. It is recommended that the Airports Division contact the SR-239 planning group to inquire about potential utility connections when the near-term and long-term development plans are prepared.

7. Storm Water System

7.1 Existing Infrastructure

The existing storm water system includes a combination of storm drainage pipes and ditches to convey water to the detention basin. Along Runway 12-30, storm drainage pipes convey water to the northeast side of the runway to a parallel drainage ditch. The drainage ditch flows southeast to the detention basin. The storm water from the existing development west of the runway is conveyed through pipes and is connected to the piping beneath the runway and to the drainage ditch. Along Runway 5-23, storm drainage pipes convey water to the south side of the runway to a parallel drainage ditch. The drainage ditch flows easterly to the detention basin. The storm drainage facilities were designed for a 10-year storm event.

The existing storm water detention basin east of Runway 5-23 has an area of approximately 15 acres. The existing basin was designed to reduce the peak storm water flows of the pre-development condition at the Airport for the 3-, 6-, and 12-hour storm duration for a 10-, 25-, 50-, and 100-year storm event. The storm water discharges from the property into the roadside ditch along Holey Road. The storm water flows east along Holey Road to Byron Highway and then north along Byron Highway to a ditch which flows into the Italian Slough.

7.2 Storm Water Infrastructure for Future Development

The storm water infrastructure improvements required to serve the near-term and long-term future development were evaluated to meet the requirements of the Contra Costa Clean Water Program (CCCWP): *Stormwater C.3 Guidebook*, 6th Edition. The Guidebook requires both flow control and water quality control to be incorporated into the storm water facilities.

The CCCWP recommends working with the County and utilizing the USEPA Hydrologic Simulation Program-Fortran (HSPF) model to simulate flows for a 30-year period. Given the preliminary nature of the planned developments, we utilized an alternative modeling approach (the Rational Method) for both flow control and water quality control, which meet CCCWP requirements. The Rational Method is more of a generalized or programmatic approach to detention basin sizing. The C.3 Guidebook stipulates that the basin should be sized to detain 80% of the total runoff during the simulation period. As the development plan becomes more focused, the Airport would begin preparing a Storm Water Master Plan and consulting with the CCCWP on modeling the proposed developments with the HSPF model.

In sizing the detention basin, it was assumed that all storm water would be treated at the detention basin. Low Impact Design (LID) features on the individual development areas were not included. As part of the future development, various on-site LID features may be required on individual sites, which would reduce the required size of the detention basin. The lands north and east of the existing basin could be utilized to expand the basin to support the future development. The existing basin could also be modified to meet the storm water requirements for the existing airport and future development, but for the purposes of this evaluation, new detention capacity constructed adjacent to the existing basin was considered in order to be conservative in cost estimating.

The storm water conveyance system for future development was preliminarily designed using concrete pipes to convey the storm water to the detention basin. The storm pipe sizing is based on a 10-year storm. It may be feasible to utilize the existing ditches parallel to the two runways to convey storm water from the development areas. The capacity of the ditches would need to be evaluated to determine if they could support the additional flows. For the purposes of this evaluation and to be conservative in cost estimating, storm drainage pipes were considered.

7.2.1 Near-Term Storm Water Improvements

The near-term storm water improvements include an expansion of the detention basin, water conveyance pipes, and storm drainage inlets. The detention basin volume required for the near-term development is approximately 1.9 acre-feet. For estimating purposes, detention basin dimensions of 380 feet long, 110 feet wide, and 2 feet deep were assumed. A concrete broad crested overflow weir for outlet control was also included to prevent overtopping of the basin during extreme storm events. The storm water conveyance for the development area southwest of Runway 12-30 includes approximately 5,600 LF of 18-inch and 24-inch diameter pipe and 14 drainage inlets/manholes. The storm water conveyance for the development north of Runway 5-23 includes approximately 2,600 LF of 12-inch diameter pipe and 7 drainage inlets/manholes.

7.2.2 Long-Term Storm Water Improvements

The long-term storm water improvements include expansion of the detention basin in addition to the expansion required for the near-term development. Conveyance pipes and storm drainage inlets would be extended to serve the development areas. The detention basin volume required for the long-term development is approximately 2.3 acre-feet. For estimating purposes, detention basin dimensions of 420 feet long, 130 feet wide, and 2 feet deep were assumed. A concrete broad crested overflow weir for outlet control was also included to prevent overtopping of the basin during extreme storm events. The storm water conveyance for the development area northeast of Runway 12-30 includes approximately 5,400 LF of 18-inch diameter pipe and 13 drainage inlets/manholes.

7.3 Opinion of Probable Construction Costs (OPCC)

An OPCC was developed for the storm water system improvements required to support future development. The OPCC only included the major construction components. Unit costs were estimated using the RS Means Heavy Construction Cost Data Manual 2013, Contractor bids for related work, and discussions with contractors/suppliers.

7.3.1 On-Site Improvements

An OPCC was prepared for extending the existing storm water system to the near-term and long-term potential development areas. The OPCC's for the near-term and long-term development are provided below.

The near-term developments include extensions of the storm water system to serve the development areas along the west side of Runway 12-30.

Near-Term Development On-Site Storm Water System Improvements

Description	Quantity	Unit Cost	Cost
12-Inch Reinforced Concrete Pipe (RCP)	2,600 LF	$48	$124,800
18-Inch RCP	2,800 LF	$70	$196,000
24-Inch RCP	2,800 LF	$100	$280,000
Drain Inlet	21 EA	$3,200	$67,200
Detention Basin Excavation	4,650 CY	$8	$37,200
Outlet Control Structure	1 LS	$15,000	$15,000
		Subtotal:	$720,200
		Contingency (25%):	$180,050
		Rounded Total:	***$900,000***

The long-term developments include extensions of the storm water system to serve the development areas along the northeast side of Runway 12-30 and immediately north of Runway 5-23. The cost for the long-term improvements only apply if the near-term improvements have already been constructed.

Long-Term Development On-Site Storm Water System Improvements

Description	Quantity	Unit Cost	Cost
18-Inch RCP	5,400 LF	$70	$378,000
Drain Inlet	13 EA	$3,200	$41,600
Detention Basin Excavation	6,100 CY	$8	$44,800
Outlet Control Structure	1 LS	$15,000	$15,000
		Subtotal:	$479,400
		Contingency (25%):	$119,850
		Rounded Total:	***$600,000***

8. Recommendations

8.1 Existing Infrastructure

No upgrades are recommended for the fire protection system for the existing conditions at the Airport. The existing fire protection system is adequate for the current usage at the Airport. The fire protection system meets current code requirements and has adequate firefighting capacity when the pond is full and during the operating season of the Byron-Bethany Canal. The nearly one million gallons of stored water in the 96-inch diameter pipeline and the supplemental pump provide sufficient backup supply outside of irrigation season. The on-going O&M activities should continue in order to maximize the life of the system. However, since the Airport has historically had issues with the fire pump, it may be beneficial to investigate the implementation of an on-site back-up system in case the main fire pump were to fail.

No septic system upgrades are recommended for the existing conditions at the Airport. The existing sanitary sewage system is currently functioning adequately and has approximately 1,000 gpd of remaining capacity. Leach fields typically have a limited useful life, approximately 15-20 years depending on usage. At some point, the leach field will need to be replaced, even without additional development. There is a reserve area established adjacent to the existing leach field. Since the existing system is near the typical useful life cycle for septic systems, the system should continue to be monitored and inspected to identify potential problems.

Since the existing groundwater well is not functioning adequately, we recommend that the Airport conduct test wells to identify a better location for a new groundwater well as described in Section 5. The groundwater well has been losing productivity and does not provide sufficient flow for current uses. The quality of the groundwater is also poor and the water is considered non-potable due to high levels of total dissolved solids. Rehabilitating the well may increase the production, but based on discussions with Dejesus Pump, it appears that the well is not located in a productive aquifer.

8.2 Near-Term and Long-Term Development Options Summary

The table below summarizes the near-term and long-term development options for the Airport. The costs are in 2013 dollars and are taken from the tables above.

Utility	Alternative Description	Near-Term OPCC	Long-Term OPCC	Total Build-out OPCC	Annual O&M Cost
Fire Protection	Expand the Existing Fire Protection System	$1,050,000	$2,080,000	$3,130,000	Not evaluated
Fire Protection	Connect to Discovery Bay (includes Domestic Water)	$4,900,000	$2,080,000	$6,980,000	Not evaluated

Utility	Alternative Description	Near-Term OPCC	Long-Term OPCC	Total Build-out OPCC	Annual O&M Cost
Sanitary Sewer	On-site Septic System	$2,520,000	$4,510,000	$7,030,000	Not evaluated
Sanitary Sewer	On-site Water Treatment Plant (WTP constructed in each phase)	$1,100,000	$2,240,000	$3,340,000	$41,400
Sanitary Sewer	On-site Water Treatment Plant (full WTP constructed in Near-Term)	$1,695,000	$865,000	$2,560,000	$41,400
Sanitary Sewer	Connect to Discovery Bay	$1,710,000	$810,000	$2,520,000	Not evaluated

Utility	Alternative Description	Near-Term OPCC	Long-Term OPCC	Total Build-out OPCC	Annual O&M Cost
Domestic Water	On-site water wells with Water Treatment Plant	$1,310,000	$1,570,000	$2,880,000	$32,500
Domestic Water	Connect to Discovery Bay (Domestic Water Only; Fire Protection handled on-site)	$3,320,000	$520,000	$3,840,000	Not evaluated
Domestic Water	Connect to Byron Bethany Irrigation District (Domestic Water Only; Fire Protection handled on-site)	$1,700,000	$520,000	$2,220,000	$32,500

8.3 Fire Protection for Future Development

The fire protection system was modeled to extend water pipelines to the near-term and long-term development areas. With the water pipeline extended to the full build-out condition (near-term and long-term development), the fire protection system meets the current code requirements and has adequate firefighting capacity when the pond is full and during the operating season of the Byron-Bethany Canal. Similar to the existing conditions, the approximately one million gallons of stored water in the 96-inch diameter pipeline and the supplemental pump will continue to provide sufficient backup supply outside of the irrigation season. In addition, water supply to the fire pond should not be an issue since the BBID has stated they would support the Airport with fire suppression by delivering water outside of the normal irrigation season, as needed.

At this moment, our recommendation is to continue to utilize the existing fire protection system with extended distribution piping and fire hydrants for the near-term and long-term development areas. The on-going O&M activities should continue in order to maximize the life of the fire pump system. An investigation of the fire pond’s filtering system could reduce the amount of debris from entering the system and thereby extending the life of the fire pump.

8.4 Sanitary Sewer for Future Development

The existing sanitary sewage septic system is currently functioning adequately and has limited capacity to support future development. However, due to the required size and cost of septic systems to support the future development, the use of septic systems for Airport expansion is not recommended. The size of the leach field as well as the leach field reserve area would also add constraints on Airport development.

At this moment, it is our recommendation that the Airport explore the construction of an on-site wastewater treatment plant to handle sanitary sewer flows generated from Airport development. With this alternative, the Airport would have control of the treatment system, and could possibly use treated effluent for landscape irrigation. This alternative would require on-going O&M of the treatment plant; however, this work can be contracted to an outside service. In order to reduce construction costs, it is recommended that the package wastewater treatment plant be installed for the required full build-out capacity during the near-term development plan, unless it is expected that the long-term development would be delayed indefinitely (beyond the long-term time frame).

8.5 Domestic Water for Future Development

The development of the Airport would require a significant amount of domestic water, which would need to be potable to support the various users. Based on a review of nearby groundwater wells and conversations with Dejesus Pump, there is a low probability of locating a groundwater source in the area with the supply and water quality needed to support the future development. The existing groundwater well production has significantly decreased since it was developed. Therefore, we do not recommend the use of groundwater wells to support future site development.

At this moment, it is our recommendation that the Airport explore construction of a package water treatment plant to treat water from BBID for potable water uses. The use of BBID water is a reliable source, and BBID has been open to discussions to supply water to the Airport. This alternative would require on-going O&M of the packaged treatment plant; however, this work can be contracted to the BBID or an outside service. A similar system is used for the nearby Mountain House community, which receives water from BBID and treats the water for potable uses at the treatment facility.

9. References

Advisory Circular 150/5300-13A Airport Design, U.S. Department of Transportation, Federal Aviation Administration, September 28, 2012.

Byron Airport Master Plan, Contra Costa County Public Works Department, Leigh Fisher Associates, June 2005.

Contra Costa Clean Water Program, Stormwater C.3 Guidebook, 6th Edition, February 15, 2012.

Contra Costa County Airports website, http://ca-contracostacounty.civicplus.com/static/depart/airport/

Central Contra Costa Sanitary District Collection System Master Plan Update, RMC Water and Environment, May 2010.

Engineer's Design Report, Airport Improvements, East Contra Costa County – Byron Airport, AIP No. 3-06-008-05, -06, & -07, Hodges & Shutt, February 1993.

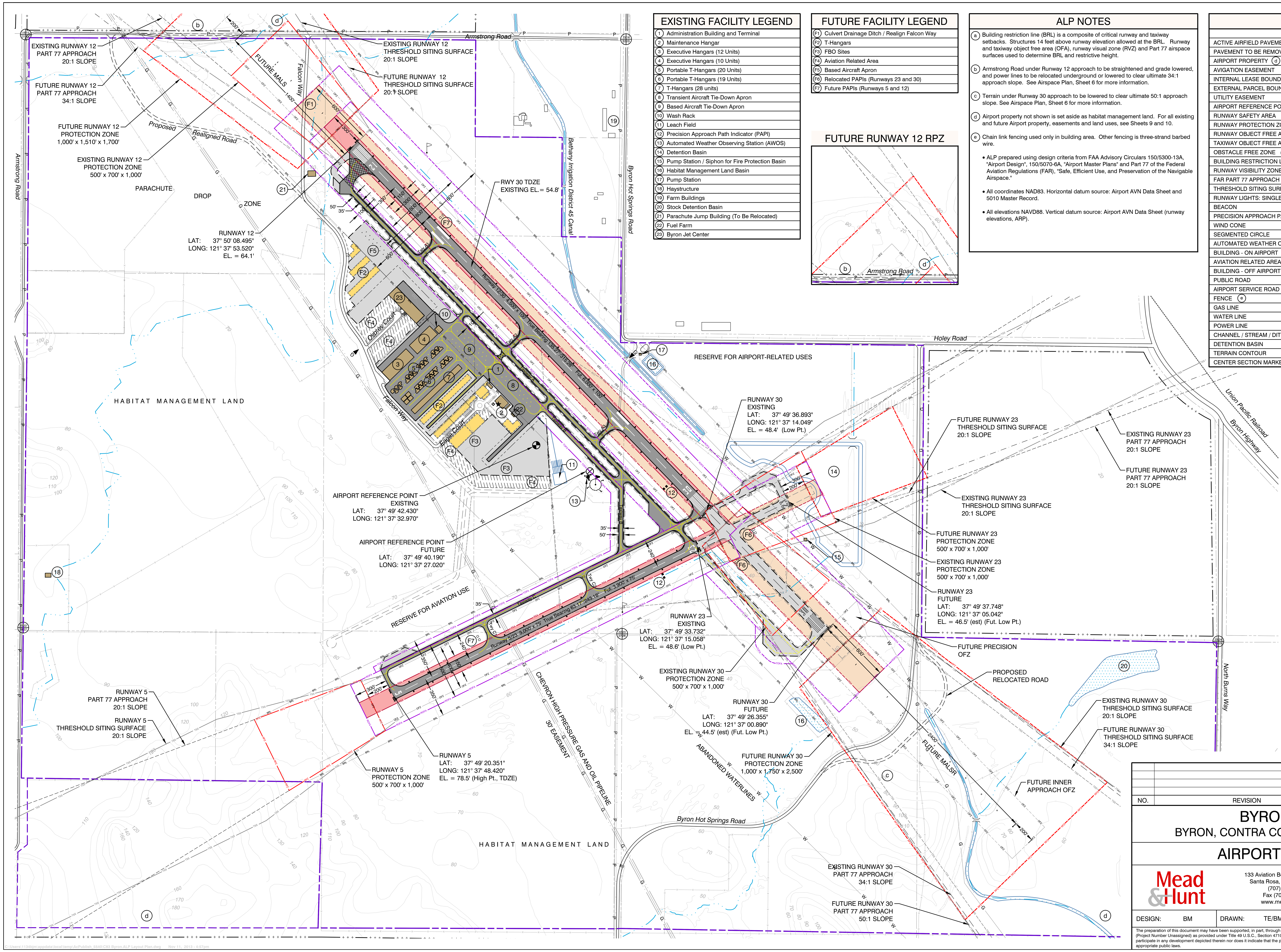
Federal Aviation Regulation Part 77, Safe, Efficient Use, and Preservation of the Navigable Airspace.

Health Officer Regulations Chapter 420-6, Subdivisions & Individual Systems, Contra Costa Health Services, October 17, 2000.

TriLink project website, http://trilink239.org/

Appendices

Appendix A Airport Layout Plan



EXISTING FACILITY LEGEND

1. Administration Building and Terminal
2. Maintenance Hangar
3. Executive Hangars (12 Units)
4. Executive Hangars (10 Units)
5. Portable T-Hangars (20 Units)
6. Portable T-Hangars (19 Units)
7. T-Hangars (28 units)
8. Transient Aircraft Tie-Down Apron
9. Based Aircraft Tie-Down Apron
10. Wash Rack
11. Leach Field
12. Precision Approach Path Indicator (PAPI)
13. Automated Weather Observing Station (AWOS)
14. Detention Basin
15. Pump Station / Siphon for Fire Protection Basin
16. Habitat Management Land Basin
17. Pump Station
18. Haystructure
19. Farm Buildings
20. Stock Detention Basin
21. Parachute Jump Building (To Be Relocated)
22. Fuel Farm
23. Byron Jet Center

FUTURE FACILITY LEGEND

- F1 Culvert Drainage Ditch / Realign Falcon Way
- F2 T-Hangars
- F3 FBO Sites
- F4 Aviation Related Area
- F5 Based Aircraft Apron
- F6 Relocated PAPIs (Runways 23 and 30)
- F7 Future PAPIs (Runways 5 and 12)

FUTURE RUNWAY 12 RPZ

ALP NOTES

(a) Building restriction line (BRL) is a composite of critical runway and taxiway setbacks. Structures 14 feet above runway elevation allowed at the BRL. Runway and taxiway object free area (OFA), runway visual zone (RVZ) and Part 77 airspace surfaces used to determine BRL and restrictive height.

(b) Armstrong Road under Runway 12 approach to be straightened and grade lowered, and power lines to be relocated underground or lowered to clear ultimate 34:1 approach slope. See Airspace Plan, Sheet 6 for more information.

(c) Terrain under Runway 30 approach to be lowered to clear ultimate 50:1 approach slope. See Airspace Plan, Sheet 6 for more information.

(d) Airport property not shown is set aside as habitat management land. For all existing and future Airport property, easements and land uses, see Sheets 9 and 10.

(e) Chain link fencing used only in building area. Other fencing is three-strand barbed wire.

- ALP prepared using design criteria from FAA Advisory Circulars 150/5300-13A, "Airport Design", 150/5070-6A, "Airport Master Plans" and Part 77 of the Federal Aviation Regulations (FAR), "Safe, Efficient Use, and Preservation of the Navigable Airspace."
- All coordinates NAD83. Horizontal datum source: Airport AVN Data Sheet and 5010 Master Record.
- All elevations NAVD88. Vertical datum source: Airport AVN Data Sheet (runway elevations, ARP).

DRAWING LEGEND

	EXISTING	FUTURE
ACTIVE AIRFIELD PAVEMENT		
PAVEMENT TO BE REMOVED	N/A	
AIRPORT PROPERTY (d)		
AVIGATION EASEMENT	N/A	
INTERNAL LEASE BOUNDARY	N/A	
EXTERNAL PARCEL BOUNDARY		N/A
UTILITY EASEMENT		N/A
AIRPORT REFERENCE POINT		
RUNWAY SAFETY AREA (RSA)	RSA	RSA
RUNWAY PROTECTION ZONE (RPZ)	RPZ	RPZ
RUNWAY OBJECT FREE AREA (ROFA)	ROFA	ROFA
TAXIWAY OBJECT FREE AREA (TOFA)	TOFA	TOFA
OBSTACLE FREE ZONE (OFZ)	OFZ	OFZ
BUILDING RESTRICTION LINE (BRL)	BRL	N/A
RUNWAY VISIBILITY ZONE (RVZ)	N/A	RVZ
FAR PART 77 APPROACH SURFACE		
THRESHOLD SITING SURFACE (TSS)	TSS	TSS
RUNWAY LIGHTS: SINGLE / THRESHOLD / REIL	● / ●●●● /	○ / ○○○○ / N/A
BEACON	★	N/A
PRECISION APPROACH PATH INDICATOR (PAPI)	■■	□□
WIND CONE		
SEGMENTED CIRCLE		N/A
AUTOMATED WEATHER OBSERVING STATION		N/A
BUILDING - ON AIRPORT		
AVIATION RELATED AREA	N/A	
BUILDING - OFF AIRPORT		N/A
PUBLIC ROAD		
AIRPORT SERVICE ROAD		
FENCE (e)		N/A
GAS LINE	G	N/A
WATER LINE	W	N/A
POWER LINE	P	N/A
CHANNEL / STREAM / DITCH		N/A
DETENTION BASIN		N/A
TERRAIN CONTOUR	60	N/A
CENTER SECTION MARKER		N/A

SUBMITTED BY:
Contra Costa County Airports

By ______________ Date

FAA Approval Space

DRAFT
Work in Progress

NO.	REVISION	SPONSOR	DATE

BYRON AIRPORT

BYRON, CONTRA COSTA COUNTY, CALIFORNIA

AIRPORT LAYOUT PLAN

Mead & Hunt
133 Aviation Boulevard, Suite 100
Santa Rosa, California 95403
(707) 526-5010
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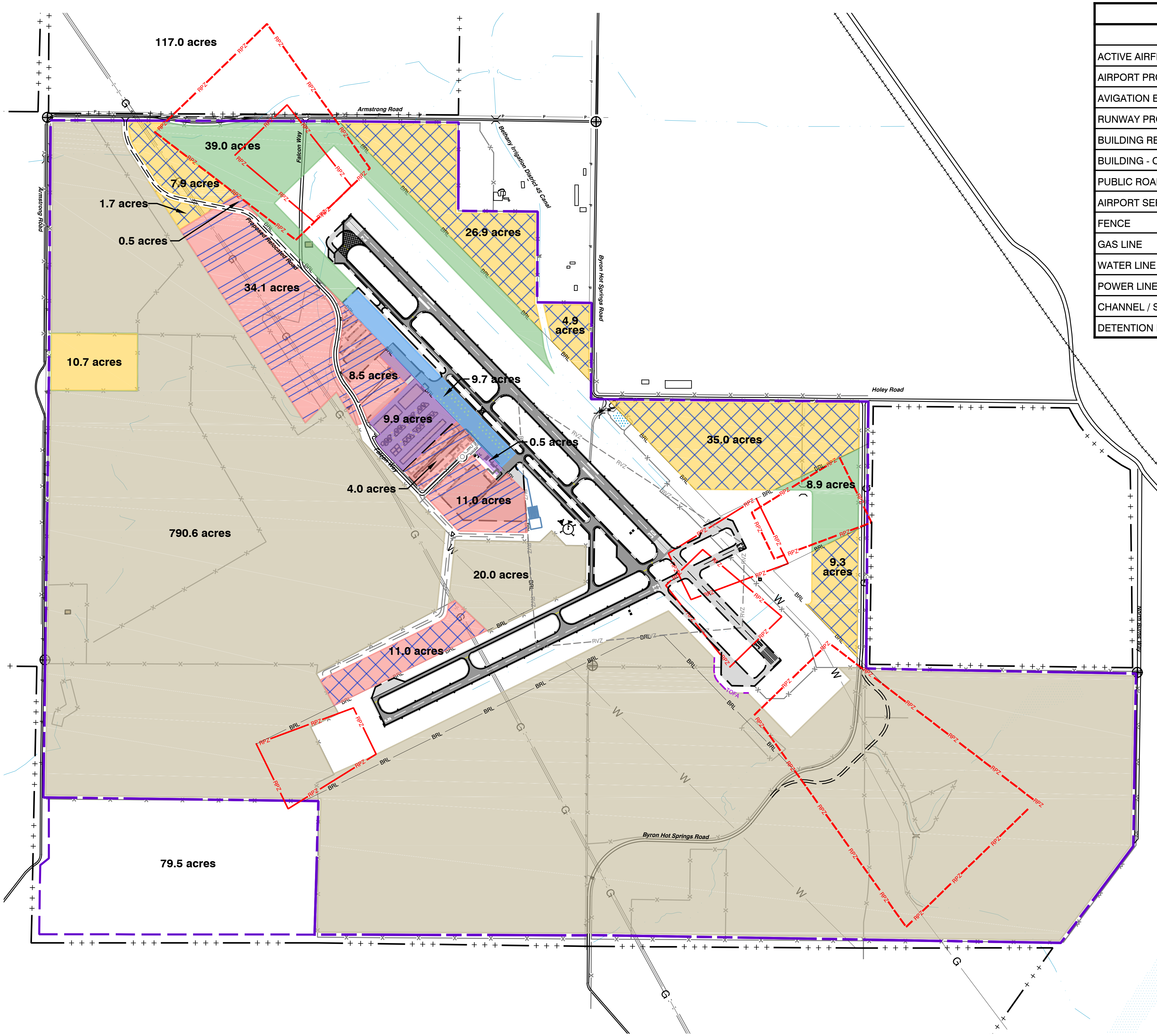
www.meadhunt.com

Contra Costa County Airports

DESIGN: BM | DRAWN: TE/BM | DATE: NOVEMBER 2013 | SHEET 2 OF 10

The preparation of this document may have been supported, in part, through the Airport Improvement Program financial assistance from the Federal Aviation Administration (Project Number Unassigned) as provided under Title 49 U.S.C., Section 47104. The contents do not in any way constitute a commitment on the part of the United States to participate in any development depicted therein nor does it indicate that the proposed development is environmentally acceptable or would have justification in accordance with appropriate public laws.

Appendix B Potential Development Areas Map



DRAWING LEGEND		
	EXISTING	FUTURE
ACTIVE AIRFIELD PAVEMENT		
AIRPORT PROPERTY		
AVIGATION EASEMENT	N/A	+ + +
RUNWAY PROTECTION ZONE	RPZ	RPZ RPZ
BUILDING RESTRICTION LINE	BRL	N/A
BUILDING - ON AIRPORT		
PUBLIC ROAD		
AIRPORT SERVICE ROAD		
FENCE	x x x	
GAS LINE	G	N/A
WATER LINE	W	N/A
POWER LINE	P	N/A
CHANNEL / STREAM / DITCH		N/A
DETENTION BASIN		N/A

LAND USE LEGEND		
	LAND USE	TOTAL ACRES
	AIRPORT RELATED	96.4
	AVIATION RESERVE	69.0
	AIRCRAFT STORAGE	10.5
	AIRCRAFT PARKING	9.7
	LOW INTENSITY USE	48.9
	HABITAT MANAGEMENT LAND	810.6
	NEAR-TERM DEVELOPMENT	56.8
	LONG-TERM DEVELOPMENT	96.7

Mead & Hunt

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CONTRA COSTA COUNTY
BYRON AIRPORT
Infrastructure and Utility Analysis

500 EAGLE COURT
BYRON, CA 94514

REVISION

NOT FOR CONSTRUCTION

M&H NO.: 4186500-121867.00
DATE: NOV. 2013
DESIGNED BY: BJM
DRAWN BY: BJM
CHECKED BY: JHK
DO NOT SCALE DRAWINGS

SHEET CONTENTS
POTENTIAL DEVELOPMENT AREAS MAP

SHEET NO.
APPX-B

Appendix C WaterCAD Model Files

Byron Airport Existing Fire Protection System

Title	Byron Airport - Fire Protection System - Existing
Engineer	
Company	Mead & Hunt, Inc.
Date	1/18/2013
Notes	Byron Airport existing fire protection system based on the as-built plans from Hodges & Schutt dated 2/1994

Scenario Summary

ID	1
Label	Base
Notes	
Active Topology	Base Active Topology
Physical	Base Physical
Demand	Base Demand
Initial Settings	Base Initial Settings
Operational	Base Operational
Age	Base Age
Constituent	Base Constituent
Trace	Base Trace
Fire Flow	Base Fire Flow
Flushing	Base Flushing
Energy Cost	Base Energy Cost
Transient	Base Transient
Pressure Dependent Demand	Base Pressure Dependent Demand
Failure History	Base Failure History
User Data Extensions	Base User Data Extensions
Steady State/EPS Solver Calculation Options	Base Calculation Options
Transient Solver Calculation Options	Base Calculation Options

Network Inventory

Pipes	36	-Constant Speed - No Pump Curve	0
Junctions	33	-Constant Speed - Pump Curve	1
Hydrants	0	-Shut Down After Time Delay	0
Tanks	0	-Variable Speed/Torque	0

Byron Airport Existing Fire Protection System

Network Inventory

-Circular	0	-Pump Start - Variable Speed/Torque	0
-Non-Circular	0	Variable Speed Pump Batteries	0
-Variable Area	0	Pump Stations	0
Reservoirs	1	PRV's	0
Pumps	1	PSV's	0
-Constant Power	0	PBV's	0
-Design Point (1 Point)	0	FCV's	0
-Standard (3 Point)	1	TCV's	0
-Standard Extended	0	GPV's	0
-Custom Extended	0	Isolation Valves	0
-Multiple Point	0	Spot Elevations	0

Transient Network Inventory

Air Valves	0	Rupture Disks	0
-Double Acting	0	Surge Valves	0
-Slow Closing	0	Surge Tanks	0
-Triple Acting	0	-Simple	0
-Vacuum Breaker	0	-Differential	0
Discharges to Atmosphere	0	-Variable Area	0
Orifice	0	Turbines	0
Rating Curve	0	Valves With Linear Area Change	0
Valve	0	Periodic Head-Flows	0
Check Valves	0	-Sinusoidal (Head)	0
-Towards Wye	0	-Not Sinusoidal (Head)	0
-Away from Wye	0	-Sinusoidal (Flow)	0
Hydropneumatic Tanks	0	-Not Sinusoidal (Flow)	0
Orifices Between Pipes	0		

Pressure Pipes Inventory

6.0 (in)	348 ft	14.0 (in)	1,231 ft
12.0 (in)	4,957 ft	All Diameters	6,535 ft

Byron Airport Existing Fire Protection System

Current Time: 19.000 hours

ID	Label	Elevation (ft)	Zone	Demand Collection	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
31	J-1	55.00	<None>	<Collection: 0 items>	0	121.10	28.6
33	J-2	56.80	<None>	<Collection: 0 items>	0	112.10	23.9
35	J-3	57.00	<None>	<Collection: 0 items>	0	110.83	23.3
37	J-4	57.30	<None>	<Collection: 0 items>	0	110.10	22.8
39	J-5	58.00	<None>	<Collection: 0 items>	0	108.35	21.8
41	J-6	59.00	<None>	<Collection: 1 items>	1,000	105.13	20.0
43	J-7	63.00	<None>	<Collection: 0 items>	0	105.41	18.3
45	J-8	66.40	<None>	<Collection: 0 items>	0	105.68	17.0
47	J-9	66.60	<None>	<Collection: 0 items>	0	105.70	16.9
49	J-10	67.00	<None>	<Collection: 0 items>	0	105.72	16.8
51	J-11	66.90	<None>	<Collection: 0 items>	0	105.80	16.8
53	J-12	66.80	<None>	<Collection: 0 items>	0	105.95	16.9
55	J-13	66.60	<None>	<Collection: 0 items>	0	106.18	17.1
57	J-14	66.40	<None>	<Collection: 0 items>	0	106.50	17.3
59	J-15	65.90	<None>	<Collection: 0 items>	0	107.11	17.8
61	J-16	65.60	<None>	<Collection: 0 items>	0	107.53	18.1
63	J-17	65.00	<None>	<Collection: 0 items>	0	108.23	18.7

Byron Airport Existing Fire Protection System

Current Time: 19.000 hours

ID	Label	Elevation (ft)	Zone	Demand Collection	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
65	J-18	64.00	<None>	<Collection: 0 items>	0	108.63	19.3
67	J-19	61.00	<None>	<Collection: 0 items>	0	109.63	21.0
69	J-20	59.00	<None>	<Collection: 0 items>	0	110.19	22.1
71	J-21	58.00	<None>	<Collection: 0 items>	0	110.41	22.7
74	J-22	60.00	<None>	<Collection: 1 items>	1,000	104.29	19.2
76	J-23	68.00	<None>	<Collection: 1 items>	0	105.38	16.2
78	J-24	67.30	<None>	<Collection: 0 items>	0	105.62	16.6
81	J-25	58.00	<None>	<Collection: 0 items>	0	110.41	22.7
83	J-26	58.00	<None>	<Collection: 0 items>	0	110.41	22.7
85	J-27	58.00	<None>	<Collection: 0 items>	0	110.41	22.7
87	J-28	58.00	<None>	<Collection: 0 items>	0	110.41	22.7
89	J-29	58.00	<None>	<Collection: 0 items>	0	110.41	22.7
91	J-0	43.00	<None>	<Collection: 0 items>	0	129.71	37.5
95	J-32	62.51	<None>	<Collection: 0 items>	0	104.93	18.4
98	J-30	59.43	<None>	<Collection: 1 items>	1,000	104.65	19.6
101	J-31	61.20	<None>	<Collection: 0 items>	0	104.78	18.9

Byron Airport Existing Fire Protection System

Current Time: 19.000 hours

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Has Check Valve?
34	P-3	464	J-1	J-2	12.0	Ductile Iron	130.0	False
36	P-4	66	J-2	J-3	12.0	Ductile Iron	130.0	False
38	P-5	92	J-3	J-4	12.0	Ductile Iron	130.0	False
40	P-6	224	J-4	J-5	12.0	Ductile Iron	130.0	False
42	P-7	410	J-5	J-6	12.0	Ductile Iron	130.0	False
44	P-8	338	J-6	J-7	12.0	Ductile Iron	130.0	False
46	P-9	336	J-7	J-8	12.0	Ductile Iron	130.0	False
48	P-10	23	J-8	J-9	12.0	Ductile Iron	130.0	False
50	P-11	35	J-9	J-10	12.0	Ductile Iron	130.0	False
52	P-12	23	J-10	J-11	12.0	Ductile Iron	130.0	False
54	P-13	45	J-11	J-12	12.0	Ductile Iron	130.0	False
56	P-14	69	J-12	J-13	12.0	Ductile Iron	130.0	False
58	P-15	94	J-13	J-14	12.0	Ductile Iron	130.0	False
60	P-16	182	J-14	J-15	12.0	Ductile Iron	130.0	False
62	P-17	127	J-15	J-16	12.0	Ductile Iron	130.0	False
64	P-18	210	J-16	J-17	12.0	Ductile Iron	130.0	False
66	P-19	118	J-17	J-18	12.0	Ductile Iron	130.0	False
68	P-20	300	J-18	J-19	12.0	Ductile Iron	130.0	False
70	P-21	168	J-19	J-20	12.0	Ductile Iron	130.0	False
72	P-22	66	J-20	J-21	12.0	Ductile Iron	130.0	False
73	P-23	126	J-21	J-3	12.0	Ductile Iron	130.0	False
79	P-26	233	J-23	J-24	12.0	Ductile Iron	130.0	False
80	P-27	100	J-24	J-10	12.0	Ductile Iron	130.0	False
82	P-28	51	J-21	J-25	6.0	Ductile Iron	130.0	False
84	P-29	182	J-25	J-26	6.0	Ductile Iron	130.0	False
86	P-30	3	J-26	J-27	6.0	Ductile Iron	130.0	False
88	P-31	111	J-27	J-28	6.0	Ductile Iron	130.0	False
90	P-32	6	J-28	J-29	12.0	Ductile Iron	130.0	False
92	P-1	240	PMP-1	J-0	14.0	Ductile Iron	130.0	False
93	P-2	942	J-0	J-1	14.0	Ductile Iron	130.0	False
94	P-0	50	R-1	PMP-1	14.0	Ductile Iron	130.0	False
97	P-25	425	J-32	J-23	12.0	Ductile Iron	130.0	False

Byron Airport Existing Fire Protection System

Current Time: 19.000 hours

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Has Check Valve?
99	P-33	138	J-6	J-30	12.0	PVC	150.0	False
100	P-24	182	J-30	J-22	12.0	PVC	150.0	False
102	P-35	193	J-32	J-31	12.0	PVC	150.0	False
103	P-34	164	J-31	J-30	12.0	PVC	150.0	False

Minor Loss Coefficient (Local)	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Has User Defined Length?	Length (User Defined) (ft)
0.000	3,000	8.51	0.019	False	0
0.000	3,000	8.51	0.019	False	0
0.000	1,839	5.22	0.008	False	0
0.000	1,839	5.22	0.008	False	0
0.000	1,839	5.22	0.008	False	0
0.000	-540	1.53	0.001	False	0
0.000	-540	1.53	0.001	False	0
0.000	-540	1.53	0.001	False	0
0.000	-540	1.53	0.001	False	0
0.000	-1,161	3.29	0.003	False	0
0.000	-1,161	3.29	0.003	False	0
0.000	-1,161	3.29	0.003	False	0
0.000	-1,161	3.29	0.003	False	0
0.000	-1,161	3.29	0.003	False	0
0.000	-1,161	3.29	0.003	False	0
0.000	-1,161	3.29	0.003	False	0
0.000	-1,161	3.29	0.003	False	0
0.000	-1,161	3.29	0.003	False	0
0.000	-1,161	3.29	0.003	False	0
0.000	-1,161	3.29	0.003	False	0
0.000	-1,161	3.29	0.003	False	0
0.000	-620	1.76	0.001	False	0
0.000	-620	1.76	0.001	False	0
0.000	0	0.00	0.000	False	0
0.000	0	0.00	0.000	False	0
0.000	0	0.00	0.000	False	0

Byron Airport Existing Fire Protection System

Current Time: 19.000 hours

Minor Loss Coefficient (Local)	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Has User Defined Length?	Length (User Defined) (ft)
0.000	0	0.00	0.000	False	0
0.000	0	0.00	0.000	False	0
0.000	3,000	6.25	0.009	False	0
0.000	3,000	6.25	0.009	False	0
0.000	3,000	6.25	0.009	False	0
0.000	-620	1.76	0.001	False	0
0.000	1,380	3.91	0.004	False	0
0.000	1,000	2.84	0.002	False	0
0.000	620	1.76	0.001	False	0
0.000	620	1.76	0.001	False	0

Byron Airport Existing Fire Protection System

Current Time: 19.000 hours

ID	Label	Elevation (ft)	Pump Definition	Status (Initial)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
29	PMP-1	0.00	Fire Pump	On	35.05	131.90	3,000	96.86

Byron Airport Existing Fire Protection System

Scenario Summary

ID	1
Label	Base
Notes	
Active Topology	Base Active Topology
Physical	Base Physical
Demand	Base Demand
Initial Settings	Base Initial Settings
Operational	Base Operational
Age	Base Age
Constituent	Base Constituent
Trace	Base Trace
Fire Flow	Base Fire Flow
Flushing	Base Flushing
Energy Cost	Base Energy Cost
Transient	Base Transient
Pressure Dependent Demand	Base Pressure Dependent Demand
Failure History	Base Failure History
User Data Extensions	Base User Data Extensions
Steady State/EPS Solver Calculation Options	Base Calculation Options
Transient Solver Calculation Options	Base Calculation Options

<General>

ID	41	Notes	
Label	J-6	Hyperlinks	<Collection: 0 items>

GIS-IDs

GIS-ID

<Geometry>

X	25,664.98 ft	Y	17,139.70 ft

Byron Airport Existing Fire Protection System

Active Topology	
Is Active?	True

Demand Collection

Demand (Base) (gpm)	Pattern (Demand)
1,000.00	3 Hour Fire

Unit Demand Collection

Number of Unit Demands	Unit Demand	Unit Demand Unit	Demand (Base) (gpm)	Pattern (Demand)

Fire Flow	
Specify Local Fire Flow Constraints?	False

Physical			
Elevation	59.00 ft	Emitter Coefficient	0.000 gpm/psi^n
Zone	<None>		

Pressure Dependent Demand	
Use Local Pressure Dependent Demand Data?	False

Transient (Initial)	
Vapor Volume (Initial)	0.0 gal

Water Quality			
Age (Initial)	0.000 hours	Is Constituent Source?	False
Concentration (Initial)	0.0 mg/L	Trace (Initial)	0.0 %

Results (Fire Flow)

Byron Airport Existing Fire Protection System

Results (Fire Flow)

Satisfies Fire Flow Constraints?	(N/A)	Fire Flow (Total Upper Limit)	(N/A) gpm
Fire Flow (Available)	(N/A) gpm	Pressure (Calculated Residual @ Total Flow Needed)	(N/A) psi
Pressure (Calculated Residual)	(N/A) psi	Pressure (Calculated Zone Lower Limit @ Total Flow Needed)	(N/A) psi
Pressure (Calculated Zone Lower Limit)	(N/A) psi	Velocity of Maximum Pipe	(N/A) ft/s
Pressure (Calculated System Lower Limit)	(N/A) psi	Junction w/ Minimum Pressure (System)	(N/A)
Is Fire Flow Run Balanced?	(N/A)	Junction w/ Minimum Pressure (Zone)	(N/A)
Fire Flow Iterations	(N/A)	Pipe w/ Maximum Velocity	(N/A)
Flow (Total Needed)	(N/A) gpm	Junction w/ Minimum Pressure (Zone @ Total Flow Needed)	(N/A)
Flow (Total Available)	(N/A) gpm		

Results (Pressure Dependent Demands)

Demand Shortage	0 gpm	Shortfall (Cumulative)	0.00 MG
Demand (Cumulative)	0.06 MG	Supply Rate (Cumulative)	100.0 %
Supply (Cumulative)	0.06 MG	Demand (Target)	1,000 gpm

Results (Statistics)

Demand (Minimum)	0 gpm	Age (Minimum)	(N/A) hours
Demand (Maximum)	1,000 gpm	Age (Maximum)	(N/A) hours
Hydraulic Grade (Maximum)	255.50 ft	Trace (Minimum)	(N/A) %
Hydraulic Grade (Minimum)	105.13 ft	Trace (Maximum)	(N/A) %
Pressure (Minimum)	20.0 psi	Concentration (Minimum)	(N/A) mg/L
Pressure (Maximum)	85.0 psi	Concentration (Maximum)	(N/A) mg/L

Results (Transient)

Head (Maximum, Transient)	(N/A) ft	Pressure (Minimum, Transient)	(N/A) psi

Byron Airport Existing Fire Protection System

Results (Transient)			
Head (Minimum, Transient)	(N/A) ft	Air Volume (Maximum, Transient)	(N/A) gal
Pressure (Maximum, Transient)	(N/A) psi	Vapor Volume (Maximum, Transient)	(N/A) gal

Results (Water Quality)			
Age (Calculated)	(N/A) hours	Concentration (Calculated)	(N/A) mg/L
Trace (Calculated)	(N/A) %		

Results			
Hydraulic Grade	105.13 ft	Pressure Head	46.13 ft
Demand	1,000 gpm	Demand Adjusted Population	(N/A) Capita
Pressure	20.0 psi	Has Calculation Messages Now?	False

Calculated Results Summary

Time (hours)	Hydraulic Grade (ft)	Pressure (psi)	Demand (gpm)
0.000	255.50	85.0	0
1.000	255.50	85.0	0
2.000	255.50	85.0	0
3.000	255.50	85.0	0
4.000	255.50	85.0	0
5.000	255.50	85.0	0
6.000	255.50	85.0	0
7.000	255.50	85.0	0
8.000	255.50	85.0	0
9.000	255.50	85.0	0
10.000	255.50	85.0	0
11.000	255.50	85.0	0
12.000	255.50	85.0	0
13.000	255.50	85.0	0
14.000	255.50	85.0	0
15.000	255.50	85.0	0

Byron Airport Existing Fire Protection System

Calculated Results Summary

Time (hours)	Hydraulic Grade (ft)	Pressure (psi)	Demand (gpm)
16.000	255.50	85.0	0
17.000	255.50	85.0	0
18.000	105.13	20.0	1,000
19.000	105.13	20.0	1,000
20.000	105.13	20.0	1,000
21.000	255.50	85.0	0
22.000	255.50	85.0	0
23.000	255.50	85.0	0
24.000	255.50	85.0	0

Byron Airport Existing Fire Protection System

Scenario Summary

ID	1
Label	Base
Notes	
Active Topology	Base Active Topology
Physical	Base Physical
Demand	Base Demand
Initial Settings	Base Initial Settings
Operational	Base Operational
Age	Base Age
Constituent	Base Constituent
Trace	Base Trace
Fire Flow	Base Fire Flow
Flushing	Base Flushing
Energy Cost	Base Energy Cost
Transient	Base Transient
Pressure Dependent Demand	Base Pressure Dependent Demand
Failure History	Base Failure History
User Data Extensions	Base User Data Extensions
Steady State/EPS Solver Calculation Options	Base Calculation Options
Transient Solver Calculation Options	Base Calculation Options

<General>

ID	74	Notes	
Label	J-22	Hyperlinks	<Collection: 0 items>

GIS-IDs

GIS-ID

<Geometry>

X	25,442.71 ft	Y	17,369.58 ft

Byron Airport Existing Fire Protection System

Active Topology	
Is Active?	True

Demand Collection

Demand (Base) (gpm)	Pattern (Demand)
1,000.00	3 Hour Fire

Unit Demand Collection

Number of Unit Demands	Unit Demand	Unit Demand Unit	Demand (Base) (gpm)	Pattern (Demand)

Fire Flow	
Specify Local Fire Flow Constraints?	False

Physical			
Elevation	60.00 ft	Emitter Coefficient	0.000 gpm/psi^n
Zone	<None>		

Pressure Dependent Demand	
Use Local Pressure Dependent Demand Data?	False

Transient (Initial)	
Vapor Volume (Initial)	0.0 gal

Water Quality			
Age (Initial)	0.000 hours	Is Constituent Source?	False
Concentration (Initial)	0.0 mg/L	Trace (Initial)	0.0 %

Results (Fire Flow)

Byron Airport Existing Fire Protection System

Results (Fire Flow)

Satisfies Fire Flow Constraints?	(N/A)	Fire Flow (Total Upper Limit)	(N/A) gpm
Fire Flow (Available)	(N/A) gpm	Pressure (Calculated Residual @ Total Flow Needed)	(N/A) psi
Pressure (Calculated Residual)	(N/A) psi	Pressure (Calculated Zone Lower Limit @ Total Flow Needed)	(N/A) psi
Pressure (Calculated Zone Lower Limit)	(N/A) psi	Velocity of Maximum Pipe	(N/A) ft/s
Pressure (Calculated System Lower Limit)	(N/A) psi	Junction w/ Minimum Pressure (System)	(N/A)
Is Fire Flow Run Balanced?	(N/A)	Junction w/ Minimum Pressure (Zone)	(N/A)
Fire Flow Iterations	(N/A)	Pipe w/ Maximum Velocity	(N/A)
Flow (Total Needed)	(N/A) gpm	Junction w/ Minimum Pressure (Zone @ Total Flow Needed)	(N/A)
Flow (Total Available)	(N/A) gpm		

Results (Pressure Dependent Demands)

Demand Shortage	0 gpm	Shortfall (Cumulative)	0.00 MG
Demand (Cumulative)	0.06 MG	Supply Rate (Cumulative)	100.0 %
Supply (Cumulative)	0.06 MG	Demand (Target)	1,000 gpm

Results (Statistics)

Demand (Minimum)	0 gpm	Age (Minimum)	(N/A) hours
Demand (Maximum)	1,000 gpm	Age (Maximum)	(N/A) hours
Hydraulic Grade (Maximum)	255.50 ft	Trace (Minimum)	(N/A) %
Hydraulic Grade (Minimum)	104.29 ft	Trace (Maximum)	(N/A) %
Pressure (Minimum)	19.2 psi	Concentration (Minimum)	(N/A) mg/L
Pressure (Maximum)	84.6 psi	Concentration (Maximum)	(N/A) mg/L

Results (Transient)

Head (Maximum, Transient)	(N/A) ft	Pressure (Minimum, Transient)	(N/A) psi

Byron Airport Existing Fire Protection System

Results (Transient)			
Head (Minimum, Transient)	(N/A) ft	Air Volume (Maximum, Transient)	(N/A) gal
Pressure (Maximum, Transient)	(N/A) psi	Vapor Volume (Maximum, Transient)	(N/A) gal

Results (Water Quality)			
Age (Calculated)	(N/A) hours	Concentration (Calculated)	(N/A) mg/L
Trace (Calculated)	(N/A) %		

Results			
Hydraulic Grade	104.29 ft	Pressure Head	44.29 ft
Demand	1,000 gpm	Demand Adjusted Population	(N/A) Capita
Pressure	19.2 psi	Has Calculation Messages Now?	False

Calculated Results Summary

Time (hours)	Hydraulic Grade (ft)	Pressure (psi)	Demand (gpm)
0.000	255.50	84.6	0
1.000	255.50	84.6	0
2.000	255.50	84.6	0
3.000	255.50	84.6	0
4.000	255.50	84.6	0
5.000	255.50	84.6	0
6.000	255.50	84.6	0
7.000	255.50	84.6	0
8.000	255.50	84.6	0
9.000	255.50	84.6	0
10.000	255.50	84.6	0
11.000	255.50	84.6	0
12.000	255.50	84.6	0
13.000	255.50	84.6	0
14.000	255.50	84.6	0
15.000	255.50	84.6	0

Byron Airport Existing Fire Protection System

Calculated Results Summary

Time (hours)	Hydraulic Grade (ft)	Pressure (psi)	Demand (gpm)
16.000	255.50	84.6	0
17.000	255.50	84.6	0
18.000	104.29	19.2	1,000
19.000	104.29	19.2	1,000
20.000	104.29	19.2	1,000
21.000	255.50	84.6	0
22.000	255.50	84.6	0
23.000	255.50	84.6	0
24.000	255.50	84.6	0

Byron Airport Existing Fire Protection System

Scenario Summary	
ID	1
Label	Base
Notes	
Active Topology	Base Active Topology
Physical	Base Physical
Demand	Base Demand
Initial Settings	Base Initial Settings
Operational	Base Operational
Age	Base Age
Constituent	Base Constituent
Trace	Base Trace
Fire Flow	Base Fire Flow
Flushing	Base Flushing
Energy Cost	Base Energy Cost
Transient	Base Transient
Pressure Dependent Demand	Base Pressure Dependent Demand
Failure History	Base Failure History
User Data Extensions	Base User Data Extensions
Steady State/EPS Solver Calculation Options	Base Calculation Options
Transient Solver Calculation Options	Base Calculation Options

<General>			
ID	98	Notes	
Label	J-30	Hyperlinks	<Collection: 0 items>

GIS-IDs

GIS-ID

<Geometry>			
X	25,569.45 ft	Y	17,238.67 ft

Byron Airport Existing Fire Protection System

Active Topology	
Is Active?	True

Demand Collection

Demand (Base) (gpm)	Pattern (Demand)
1,000.00	3 Hour Fire

Unit Demand Collection

Number of Unit Demands	Unit Demand	Unit Demand Unit	Demand (Base) (gpm)	Pattern (Demand)

Fire Flow	
Specify Local Fire Flow Constraints?	False

Physical			
Elevation	59.43 ft	Emitter Coefficient	0.000 gpm/psi^n
Zone	<None>		

Pressure Dependent Demand	
Use Local Pressure Dependent Demand Data?	False

Transient (Initial)	
Vapor Volume (Initial)	0.0 gal

Water Quality			
Age (Initial)	0.000 hours	Is Constituent Source?	False
Concentration (Initial)	0.0 mg/L	Trace (Initial)	0.0 %

Results (Fire Flow)

Byron Airport Existing Fire Protection System

Results (Fire Flow)

Satisfies Fire Flow Constraints?	(N/A)	Fire Flow (Total Upper Limit)	(N/A) gpm
Fire Flow (Available)	(N/A) gpm	Pressure (Calculated Residual @ Total Flow Needed)	(N/A) psi
Pressure (Calculated Residual)	(N/A) psi	Pressure (Calculated Zone Lower Limit @ Total Flow Needed)	(N/A) psi
Pressure (Calculated Zone Lower Limit)	(N/A) psi	Velocity of Maximum Pipe	(N/A) ft/s
Pressure (Calculated System Lower Limit)	(N/A) psi	Junction w/ Minimum Pressure (System)	(N/A)
Is Fire Flow Run Balanced?	(N/A)	Junction w/ Minimum Pressure (Zone)	(N/A)
Fire Flow Iterations	(N/A)	Pipe w/ Maximum Velocity	(N/A)
Flow (Total Needed)	(N/A) gpm	Junction w/ Minimum Pressure (Zone @ Total Flow Needed)	(N/A)
Flow (Total Available)	(N/A) gpm		

Results (Pressure Dependent Demands)

Demand Shortage	0 gpm	Shortfall (Cumulative)	0.00 MG
Demand (Cumulative)	0.06 MG	Supply Rate (Cumulative)	100.0 %
Supply (Cumulative)	0.06 MG	Demand (Target)	1,000 gpm

Results (Statistics)

Demand (Minimum)	0 gpm	Age (Minimum)	(N/A) hours
Demand (Maximum)	1,000 gpm	Age (Maximum)	(N/A) hours
Hydraulic Grade (Maximum)	255.50 ft	Trace (Minimum)	(N/A) %
Hydraulic Grade (Minimum)	104.65 ft	Trace (Maximum)	(N/A) %
Pressure (Minimum)	19.6 psi	Concentration (Minimum)	(N/A) mg/L
Pressure (Maximum)	84.8 psi	Concentration (Maximum)	(N/A) mg/L

Results (Transient)

Head (Maximum, Transient)	(N/A) ft	Pressure (Minimum, Transient)	(N/A) psi

Byron Airport Existing Fire Protection System

Results (Transient)			
Head (Minimum, Transient)	(N/A) ft	Air Volume (Maximum, Transient)	(N/A) gal
Pressure (Maximum, Transient)	(N/A) psi	Vapor Volume (Maximum, Transient)	(N/A) gal

Results (Water Quality)			
Age (Calculated)	(N/A) hours	Concentration (Calculated)	(N/A) mg/L
Trace (Calculated)	(N/A) %		

Results			
Hydraulic Grade	104.65 ft	Pressure Head	45.22 ft
Demand	1,000 gpm	Demand Adjusted Population	(N/A) Capita
Pressure	19.6 psi	Has Calculation Messages Now?	False

Calculated Results Summary

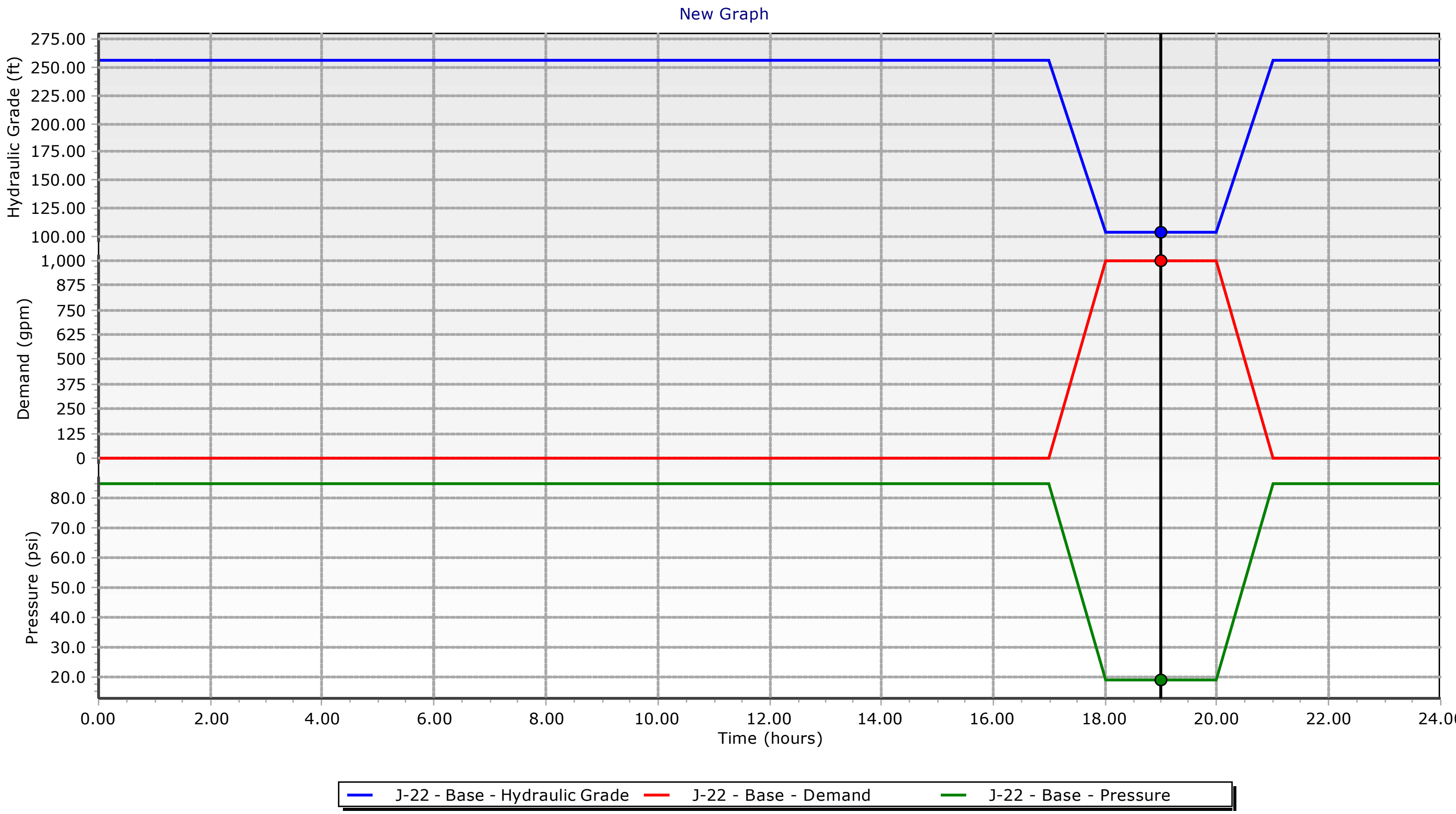
Time (hours)	Hydraulic Grade (ft)	Pressure (psi)	Demand (gpm)
0.000	255.50	84.8	0
1.000	255.50	84.8	0
2.000	255.50	84.8	0
3.000	255.50	84.8	0
4.000	255.50	84.8	0
5.000	255.50	84.8	0
6.000	255.50	84.8	0
7.000	255.50	84.8	0
8.000	255.50	84.8	0
9.000	255.50	84.8	0
10.000	255.50	84.8	0
11.000	255.50	84.8	0
12.000	255.50	84.8	0
13.000	255.50	84.8	0
14.000	255.50	84.8	0
15.000	255.50	84.8	0

Byron Airport Existing Fire Protection System

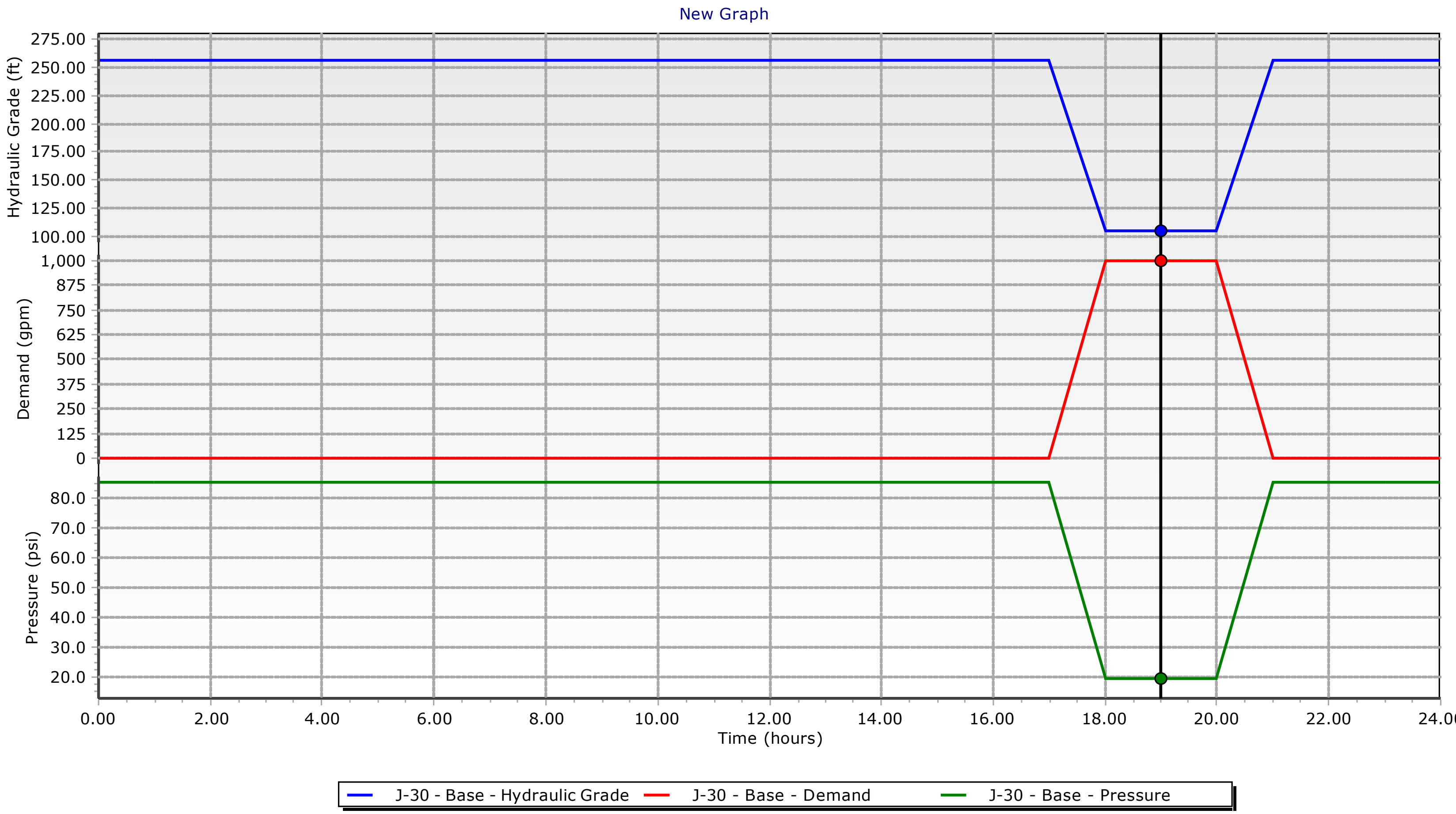
Calculated Results Summary

Time (hours)	Hydraulic Grade (ft)	Pressure (psi)	Demand (gpm)
16.000	255.50	84.8	0
17.000	255.50	84.8	0
18.000	104.65	19.6	1,000
19.000	104.65	19.6	1,000
20.000	104.65	19.6	1,000
21.000	255.50	84.8	0
22.000	255.50	84.8	0
23.000	255.50	84.8	0
24.000	255.50	84.8	0

New Graph
Hydraulic Grade (ft)
275.00
250.00
225.00
200.00
175.00
150.00
125.00
100.00
Demand (gpm)
1,000
875
750
625
500
375
250
125
0
Pressure (psi)
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
18.00
20.00
22.00
24.00
Time (hours)
J-6 - Base - Hydraulic Grade
J-6 - Base - Demand
J-6 - Base - Pressure



New Graph
Hydraulic Grade (ft)
275.00
250.00
225.00
200.00
175.00
150.00
125.00
100.00
Demand (gpm)
1,000
875
750
625
500
375
250
125
0
Pressure (psi)
80.0
70.0
60.0
50.0
40.0
30.0
20.0
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
18.00
20.00
22.00
24.00
Time (hours)
J-22 - Base - Hydraulic Grade
J-22 - Base - Demand
J-22 - Base - Pressure


New Graph
Hydraulic Grade (ft)
275.00
250.00
225.00
200.00
175.00
150.00
125.00
100.00
Demand (gpm)
1,000
875
750
625
500
375
250
125
0
Pressure (psi)
80.0
70.0
60.0
50.0
40.0
30.0
20.0
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
18.00
20.00
22.00
24.00
Time (hours)
J-30 - Base - Hydraulic Grade
J-30 - Base - Demand
J-30 - Base - Pressure

Project Inventory: Bryon Airport proposed fire protection.wtg

Title	Byron Airport - Fire Protection System - Existing
Engineer	
Company	Mead & Hunt, Inc.
Date	1/18/2013
Notes	Byron Airport existing fire protection system based on the as-built plans from Hodges & Schutt dated 2/1994

Scenario Summary

ID	1
Label	Base
Notes	
Active Topology	Base Active Topology
Physical	Base Physical
Demand	Base Demand
Initial Settings	Base Initial Settings
Operational	Base Operational
Age	Base Age
Constituent	Base Constituent
Trace	Base Trace
Fire Flow	Base Fire Flow
Flushing	Base Flushing
Energy Cost	Base Energy Cost
Transient	Base Transient
Pressure Dependent Demand	Base Pressure Dependent Demand
Failure History	Base Failure History
User Data Extensions	Base User Data Extensions
Steady State/EPS Solver Calculation Options	Base Calculation Options
Transient Solver Calculation Options	Base Calculation Options

Network Inventory

Pipes	89	-Constant Speed - No Pump Curve	0
Junctions	82	-Constant Speed - Pump Curve	1

Project Inventory: Bryon Airport proposed fire protection.wtg

Network Inventory

Hydrants	0	-Shut Down After Time Delay	0
Tanks	0	-Variable Speed/Torque	0
-Circular	0	-Pump Start - Variable Speed/Torque	0
-Non-Circular	0	Variable Speed Pump Batteries	0
-Variable Area	0	Pump Stations	0
Reservoirs	1	PRV's	0
Pumps	1	PSV's	0
-Constant Power	0	PBV's	0
-Design Point (1 Point)	0	FCV's	0
-Standard (3 Point)	1	TCV's	0
-Standard Extended	0	GPV's	0
-Custom Extended	0	Isolation Valves	0
-Multiple Point	0	Spot Elevations	0

Transient Network Inventory

Air Valves	0	Rupture Disks	0
-Double Acting	0	Surge Valves	0
-Slow Closing	0	Surge Tanks	0
-Triple Acting	0	-Simple	0
-Vacuum Breaker	0	-Differential	0
Discharges to Atmosphere	0	-Variable Area	0
Orifice	0	Turbines	0
Rating Curve	0	Valves With Linear Area Change	0
Valve	0	Periodic Head-Flows	0
Check Valves	0	-Sinusoidal (Head)	0
-Towards Wye	0	-Not Sinusoidal (Head)	0
-Away from Wye	0	-Sinusoidal (Flow)	0
Hydropneumatic Tanks	0	-Not Sinusoidal (Flow)	0
Orifices Between Pipes	0		

Project Inventory: Bryon Airport proposed fire protection.wtg

Pressure Pipes Inventory			
6.0 (in)	354 ft	14.0 (in)	1,231 ft
12.0 (in)	26,723 ft	All Diameters	28,307 ft

FlexTable: Junction Table (Bryon Airport proposed fire protection.wtg)

Current Time: 19.000 hours

ID	Label	Elevation (ft)	Zone	Demand Collection	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
31	J-1	55.00	<None>	<Collection: 0 items>	0	128.41	31.8
33	J-2	56.80	<None>	<Collection: 0 items>	0	128.78	31.1
35	J-3	57.00	<None>	<Collection: 0 items>	0	128.83	31.1
37	J-4	57.30	<None>	<Collection: 0 items>	0	128.86	31.0
39	J-5	58.00	<None>	<Collection: 0 items>	0	128.93	30.7
41	J-6	59.00	<None>	<Collection: 0 items>	0	129.05	30.3
43	J-7	63.00	<None>	<Collection: 0 items>	0	129.05	28.6
45	J-8	66.40	<None>	<Collection: 0 items>	0	129.05	27.1
47	J-9	66.60	<None>	<Collection: 0 items>	0	129.05	27.0
49	J-10	67.00	<None>	<Collection: 0 items>	0	129.05	26.8
51	J-11	66.90	<None>	<Collection: 0 items>	0	129.05	26.9
53	J-12	66.80	<None>	<Collection: 0 items>	0	129.04	26.9
55	J-13	66.60	<None>	<Collection: 0 items>	0	129.03	27.0
57	J-14	66.40	<None>	<Collection: 0 items>	0	129.02	27.1
59	J-15	65.90	<None>	<Collection: 0 items>	0	128.99	27.3
61	J-16	65.60	<None>	<Collection: 0 items>	0	128.98	27.4

FlexTable: Junction Table (Bryon Airport proposed fire protection.wtg)

Current Time: 19.000 hours

ID	Label	Elevation (ft)	Zone	Demand Collection	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
63	J-17	65.00	<None>	<Collection: 0 items>	0	128.95	27.7
65	J-18	64.00	<None>	<Collection: 0 items>	0	128.93	28.1
67	J-19	61.00	<None>	<Collection: 0 items>	0	128.88	29.4
69	J-20	59.00	<None>	<Collection: 0 items>	0	128.86	30.2
71	J-21	58.00	<None>	<Collection: 0 items>	0	128.85	30.7
74	J-22	60.00	<None>	<Collection: 0 items>	0	129.12	29.9
76	J-23	68.00	<None>	<Collection: 1 items>	0	129.10	26.4
78	J-24	67.30	<None>	<Collection: 0 items>	0	129.07	26.7
81	J-25	58.00	<None>	<Collection: 0 items>	0	128.85	30.7
83	J-26	58.00	<None>	<Collection: 0 items>	0	128.85	30.7
85	J-27	58.00	<None>	<Collection: 0 items>	0	128.85	30.7
87	J-28	58.00	<None>	<Collection: 0 items>	0	128.85	30.7
89	J-29	58.00	<None>	<Collection: 0 items>	0	128.85	30.7
91	J-0	43.00	<None>	<Collection: 0 items>	0	133.06	39.0
95	J-32	62.51	<None>	<Collection: 0 items>	0	129.09	28.8
98	J-30	59.43	<None>	<Collection: 0 items>	0	129.09	30.1

FlexTable: Junction Table (Bryon Airport proposed fire protection.wtg)

Current Time: 19.000 hours

ID	Label	Elevation (ft)	Zone	Demand Collection	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
101	J-31	61.20	<None>	<Collection: 0 items>	0	129.09	29.4
107	J-34	60.00	<None>	<Collection: 0 items>	0	129.22	29.9
109	J-35	60.00	<None>	<Collection: 0 items>	0	129.31	30.0
111	J-36	60.00	<None>	<Collection: 0 items>	0	129.36	30.0
113	J-37	60.00	<None>	<Collection: 0 items>	0	129.36	30.0
115	J-38	60.00	<None>	<Collection: 0 items>	0	129.36	30.0
117	J-39	60.00	<None>	<Collection: 0 items>	0	129.29	30.0
119	J-40	60.00	<None>	<Collection: 0 items>	0	129.21	29.9
121	J-41	60.00	<None>	<Collection: 0 items>	0	129.15	29.9
124	J-42	60.00	<None>	<Collection: 0 items>	0	129.40	30.0
126	J-43	60.00	<None>	<Collection: 0 items>	0	129.49	30.1
128	J-44	60.00	<None>	<Collection: 0 items>	0	129.52	30.1
130	J-45	60.00	<None>	<Collection: 0 items>	0	129.52	30.1
132	J-46	60.00	<None>	<Collection: 0 items>	0	129.52	30.1
134	J-47	60.00	<None>	<Collection: 0 items>	0	129.44	30.0
137	J-48	60.00	<None>	<Collection: 0 items>	0	129.59	30.1

FlexTable: Junction Table (Bryon Airport proposed fire protection.wtg)

Current Time: 19.000 hours

ID	Label	Elevation (ft)	Zone	Demand Collection	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
139	J-49	60.00	<None>	<Collection: 0 items>	0	129.70	30.2
141	J-50	60.00	<None>	<Collection: 0 items>	0	129.71	30.2
143	J-51	60.00	<None>	<Collection: 0 items>	0	129.68	30.1
145	J-52	60.00	<None>	<Collection: 0 items>	0	129.65	30.1
147	J-53	60.00	<None>	<Collection: 0 items>	0	129.64	30.1
149	J-54	60.00	<None>	<Collection: 0 items>	0	129.58	30.1
152	J-55	60.00	<None>	<Collection: 0 items>	0	121.00	26.4
154	J-56	60.00	<None>	<Collection: 0 items>	0	115.67	24.1
156	J-57	60.00	<None>	<Collection: 0 items>	0	108.23	20.9
158	J-58	60.00	<None>	<Collection: 0 items>	0	104.33	19.2
160	J-59	60.00	<None>	<Collection: 1 items>	1,000	101.38	17.9
162	J-60	60.00	<None>	<Collection: 1 items>	1,000	97.86	16.4
164	J-61	60.00	<None>	<Collection: 1 items>	1,000	96.89	16.0
166	J-62	43.24	<None>	<Collection: 0 items>	0	132.93	38.8
169	J-63	60.00	<None>	<Collection: 0 items>	0	132.89	31.5
171	J-64	60.00	<None>	<Collection: 0 items>	0	132.60	31.4

FlexTable: Junction Table (Bryon Airport proposed fire protection.wtg)

Current Time: 19.000 hours

ID	Label	Elevation (ft)	Zone	Demand Collection	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
173	J-65	60.00	<None>	<Collection: 0 items>	0	132.30	31.3
175	J-66	60.00	<None>	<Collection: 0 items>	0	132.00	31.2
177	J-67	60.00	<None>	<Collection: 0 items>	0	131.70	31.0
179	J-68	60.00	<None>	<Collection: 0 items>	0	131.39	30.9
181	J-69	60.00	<None>	<Collection: 0 items>	0	131.09	30.8
183	J-70	60.00	<None>	<Collection: 0 items>	0	130.77	30.6
185	J-71	60.00	<None>	<Collection: 0 items>	0	132.93	31.6
187	J-72	60.00	<None>	<Collection: 0 items>	0	132.93	31.6
189	J-73	60.00	<None>	<Collection: 0 items>	0	132.93	31.6
191	J-74	60.00	<None>	<Collection: 0 items>	0	132.93	31.6
193	J-75	60.00	<None>	<Collection: 0 items>	0	132.93	31.6
195	J-76	60.00	<None>	<Collection: 0 items>	0	132.93	31.6
197	J-77	60.00	<None>	<Collection: 0 items>	0	132.93	31.6
199	J-78	60.00	<None>	<Collection: 0 items>	0	132.93	31.6
201	J-79	60.00	<None>	<Collection: 0 items>	0	132.93	31.6
203	J-80	60.00	<None>	<Collection: 0 items>	0	132.93	31.6

FlexTable: Junction Table (Bryon Airport proposed fire protection.wtg)

Current Time: 19.000 hours

ID	Label	Elevation (ft)	Zone	Demand Collection	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
205	J-81	60.00	<None>	<Collection: 0 items>	0	132.93	31.6
207	J-82	60.00	<None>	<Collection: 0 items>	0	132.93	31.6

FlexTable: Pipe Table (Bryon Airport proposed fire protection.wtg)

Current Time: 19.000 hours

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Has Check Valve?
34	P-3	464	J-1	J-2	12.0	Ductile Iron	130.0	False
36	P-4	66	J-2	J-3	12.0	Ductile Iron	130.0	False
38	P-5	92	J-3	J-4	12.0	Ductile Iron	130.0	False
40	P-6	224	J-4	J-5	12.0	Ductile Iron	130.0	False
42	P-7	410	J-5	J-6	12.0	Ductile Iron	130.0	False
44	P-8	338	J-6	J-7	12.0	Ductile Iron	130.0	False
46	P-9	336	J-7	J-8	12.0	Ductile Iron	130.0	False
48	P-10	23	J-8	J-9	12.0	Ductile Iron	130.0	False
50	P-11	35	J-9	J-10	12.0	Ductile Iron	130.0	False
52	P-12	23	J-10	J-11	12.0	Ductile Iron	130.0	False
54	P-13	45	J-11	J-12	12.0	Ductile Iron	130.0	False
56	P-14	69	J-12	J-13	12.0	Ductile Iron	130.0	False
58	P-15	94	J-13	J-14	12.0	Ductile Iron	130.0	False
60	P-16	182	J-14	J-15	12.0	Ductile Iron	130.0	False
62	P-17	127	J-15	J-16	12.0	Ductile Iron	130.0	False
64	P-18	210	J-16	J-17	12.0	Ductile Iron	130.0	False
66	P-19	118	J-17	J-18	12.0	Ductile Iron	130.0	False
68	P-20	300	J-18	J-19	12.0	Ductile Iron	130.0	False
70	P-21	168	J-19	J-20	12.0	Ductile Iron	130.0	False
72	P-22	66	J-20	J-21	12.0	Ductile Iron	130.0	False
73	P-23	126	J-21	J-3	12.0	Ductile Iron	130.0	False
79	P-26	233	J-23	J-24	12.0	Ductile Iron	130.0	False
80	P-27	100	J-24	J-10	12.0	Ductile Iron	130.0	False
82	P-28	51	J-21	J-25	6.0	Ductile Iron	130.0	False
84	P-29	182	J-25	J-26	6.0	Ductile Iron	130.0	False
86	P-30	3	J-26	J-27	6.0	Ductile Iron	130.0	False
88	P-31	111	J-27	J-28	6.0	Ductile Iron	130.0	False
90	P-32	6	J-28	J-29	6.0	Ductile Iron	130.0	False
92	P-1	240	PMP-1	J-0	14.0	Ductile Iron	130.0	False
94	P-0	50	R-1	PMP-1	14.0	Ductile Iron	130.0	False
97	P-25	425	J-32	J-23	12.0	Ductile Iron	130.0	False

FlexTable: Pipe Table (Bryon Airport proposed fire protection.wtg)

Current Time: 19.000 hours

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Has Check Valve?
99	P-33	138	J-6	J-30	12.0	PVC	150.0	False
100	P-24	182	J-30	J-22	12.0	PVC	150.0	False
102	P-35	193	J-32	J-31	12.0	PVC	150.0	False
103	P-34	164	J-31	J-30	12.0	PVC	150.0	False
108	P-42	510	J-22	J-34	12.0	PVC	150.0	False
110	P-43	500	J-34	J-35	12.0	PVC	150.0	False
112	P-44	285	J-35	J-36	12.0	PVC	150.0	False
114	P-45	380	J-36	J-37	12.0	PVC	150.0	False
116	P-46	381	J-37	J-38	12.0	PVC	150.0	False
118	P-47	510	J-38	J-39	12.0	PVC	150.0	False
120	P-48	509	J-39	J-40	12.0	PVC	150.0	False
122	P-49	412	J-40	J-41	12.0	PVC	150.0	False
123	P-50	338	J-41	J-23	12.0	PVC	150.0	False
125	P-51	214	J-36	J-42	12.0	PVC	150.0	False
127	P-52	499	J-42	J-43	12.0	PVC	150.0	False
129	P-53	176	J-43	J-44	12.0	PVC	150.0	False
131	P-54	297	J-44	J-45	12.0	PVC	150.0	False
133	P-55	293	J-45	J-46	12.0	PVC	150.0	False
135	P-56	469	J-46	J-47	12.0	PVC	150.0	False
136	P-57	499	J-47	J-38	12.0	PVC	150.0	False
138	P-58	324	J-44	J-48	12.0	PVC	150.0	False
140	P-59	501	J-48	J-49	12.0	PVC	150.0	False
142	P-60	61	J-49	J-50	12.0	PVC	150.0	False
144	P-61	245	J-50	J-51	12.0	PVC	150.0	False
146	P-62	244	J-51	J-52	12.0	PVC	150.0	False
148	P-63	122	J-52	J-53	12.0	PVC	150.0	False
150	P-64	500	J-53	J-54	12.0	PVC	150.0	False
151	P-65	500	J-54	J-46	12.0	PVC	150.0	False
153	P-66	498	J-1	J-55	12.0	PVC	150.0	False
155	P-67	359	J-55	J-56	12.0	PVC	150.0	False
157	P-68	500	J-56	J-57	12.0	PVC	150.0	False

FlexTable: Pipe Table (Bryon Airport proposed fire protection.wtg)

Current Time: 19.000 hours

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Has Check Valve?
159	P-69	262	J-57	J-58	12.0	PVC	150.0	False
161	P-70	199	J-58	J-59	12.0	PVC	150.0	False
163	P-71	501	J-59	J-60	12.0	PVC	150.0	False
165	P-72	500	J-60	J-61	12.0	PVC	150.0	False
167	P-73	19	J-0	J-62	14.0	PVC	150.0	False
168	P-74	923	J-62	J-1	14.0	PVC	150.0	False
170	P-75	56	J-62	J-63	12.0	PVC	150.0	False
172	P-76	475	J-63	J-64	12.0	PVC	150.0	False
174	P-77	501	J-64	J-65	12.0	PVC	150.0	False
176	P-78	499	J-65	J-66	12.0	PVC	150.0	False
178	P-79	501	J-66	J-67	12.0	PVC	150.0	False
180	P-80	500	J-67	J-68	12.0	PVC	150.0	False
182	P-81	499	J-68	J-69	12.0	PVC	150.0	False
184	P-82	528	J-69	J-70	12.0	PVC	150.0	False
186	P-83	16	J-62	J-71	12.0	PVC	150.0	False
188	P-84	96	J-71	J-72	12.0	PVC	150.0	False
190	P-85	500	J-72	J-73	12.0	PVC	150.0	False
192	P-86	501	J-73	J-74	12.0	PVC	150.0	False
194	P-87	498	J-74	J-75	12.0	PVC	150.0	False
196	P-88	501	J-75	J-76	12.0	PVC	150.0	False
198	P-89	500	J-76	J-77	12.0	PVC	150.0	False
200	P-90	501	J-77	J-78	12.0	PVC	150.0	False
202	P-91	498	J-78	J-79	12.0	PVC	150.0	False
204	P-92	501	J-79	J-80	12.0	PVC	150.0	False
206	P-93	500	J-80	J-81	12.0	PVC	150.0	False
208	P-94	264	J-81	J-82	12.0	PVC	150.0	False
209	P-95	1,746	J-70	J-50	12.0	PVC	150.0	False

Minor Loss Coefficient (Local)	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Has User Defined Length?	Length (User Defined) (ft)
0.000	-532	1.51	0.001	False	0

FlexTable: Pipe Table (Bryon Airport proposed fire protection.wtg)

Current Time: 19.000 hours

Minor Loss Coefficient (Local)	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Has User Defined Length?	Length (User Defined) (ft)
0.000	-532	1.51	0.001	False	0
0.000	-319	0.91	0.000	False	0
0.000	-319	0.91	0.000	False	0
0.000	-319	0.91	0.000	False	0
0.000	13	0.04	0.000	False	0
0.000	13	0.04	0.000	False	0
0.000	13	0.04	0.000	False	0
0.000	13	0.04	0.000	False	0
0.000	213	0.61	0.000	False	0
0.000	213	0.61	0.000	False	0
0.000	213	0.61	0.000	False	0
0.000	213	0.61	0.000	False	0
0.000	213	0.61	0.000	False	0
0.000	213	0.61	0.000	False	0
0.000	213	0.61	0.000	False	0
0.000	213	0.61	0.000	False	0
0.000	213	0.61	0.000	False	0
0.000	213	0.61	0.000	False	0
0.000	213	0.61	0.000	False	0
0.000	213	0.61	0.000	False	0
0.000	200	0.57	0.000	False	0
0.000	200	0.57	0.000	False	0
0.000	0	0.00	0.000	False	0
0.000	0	0.00	0.000	False	0
0.000	0	0.00	0.000	False	0
0.000	0	0.00	0.000	False	0
0.000	0	0.00	0.000	False	0
0.000	3,000	6.25	0.009	False	0
0.000	3,000	6.25	0.009	False	0
0.000	-52	0.15	0.000	False	0

FlexTable: Pipe Table (Bryon Airport proposed fire protection.wtg)

Current Time: 19.000 hours

Minor Loss Coefficient (Local)	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Has User Defined Length?	Length (User Defined) (ft)
0.000	-333	0.94	0.000	False	0
0.000	-281	0.80	0.000	False	0
0.000	52	0.15	0.000	False	0
0.000	52	0.15	0.000	False	0
0.000	-281	0.80	0.000	False	0
0.000	-281	0.80	0.000	False	0
0.000	-281	0.80	0.000	False	0
0.000	-8	0.02	0.000	False	0
0.000	-8	0.02	0.000	False	0
0.000	251	0.71	0.000	False	0
0.000	251	0.71	0.000	False	0
0.000	251	0.71	0.000	False	0
0.000	251	0.71	0.000	False	0
0.000	-273	0.78	0.000	False	0
0.000	-273	0.78	0.000	False	0
0.000	-273	0.78	0.000	False	0
0.000	35	0.10	0.000	False	0
0.000	35	0.10	0.000	False	0
0.000	259	0.73	0.000	False	0
0.000	259	0.73	0.000	False	0
0.000	-308	0.87	0.000	False	0
0.000	-308	0.87	0.000	False	0
0.000	-308	0.87	0.000	False	0
0.000	224	0.64	0.000	False	0
0.000	224	0.64	0.000	False	0
0.000	224	0.64	0.000	False	0
0.000	224	0.64	0.000	False	0
0.000	224	0.64	0.000	False	0
0.000	3,000	8.51	0.015	False	0
0.000	3,000	8.51	0.015	False	0

FlexTable: Pipe Table (Bryon Airport proposed fire protection.wtg)

Current Time: 19.000 hours

Minor Loss Coefficient (Local)	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Has User Defined Length?	Length (User Defined) (ft)
0.000	3,000	8.51	0.015	False	0
0.000	3,000	8.51	0.015	False	0
0.000	3,000	8.51	0.015	False	0
0.000	2,000	5.67	0.007	False	0
0.000	1,000	2.84	0.002	False	0
0.000	3,000	6.25	0.007	False	0
0.000	2,468	5.14	0.005	False	0
0.000	532	1.51	0.001	False	0
0.000	532	1.51	0.001	False	0
0.000	532	1.51	0.001	False	0
0.000	532	1.51	0.001	False	0
0.000	532	1.51	0.001	False	0
0.000	532	1.51	0.001	False	0
0.000	532	1.51	0.001	False	0
0.000	532	1.51	0.001	False	0
0.000	0	0.00	0.000	False	0
0.000	0	0.00	0.000	False	0
0.000	0	0.00	0.000	False	0
0.000	0	0.00	0.000	False	0
0.000	0	0.00	0.000	False	0
0.000	0	0.00	0.000	False	0
0.000	0	0.00	0.000	False	0
0.000	0	0.00	0.000	False	0
0.000	0	0.00	0.000	False	0
0.000	0	0.00	0.000	False	0
0.000	0	0.00	0.000	False	0
0.000	0	0.00	0.000	False	0
0.000	532	1.51	0.001	False	0

FlexTable: Pump Table (Bryon Airport proposed fire protection.wtg)

Current Time: 19.000 hours

ID	Label	Elevation (ft)	Pump Definition	Status (Initial)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
29	PMP-1	0.00	Fire Pump	On	35.05	135.25	3,000	100.20

Junction Detailed Report: J-59

Scenario Summary	
ID	1
Label	Base
Notes	
Active Topology	Base Active Topology
Physical	Base Physical
Demand	Base Demand
Initial Settings	Base Initial Settings
Operational	Base Operational
Age	Base Age
Constituent	Base Constituent
Trace	Base Trace
Fire Flow	Base Fire Flow
Flushing	Base Flushing
Energy Cost	Base Energy Cost
Transient	Base Transient
Pressure Dependent Demand	Base Pressure Dependent Demand
Failure History	Base Failure History
User Data Extensions	Base User Data Extensions
Steady State/EPS Solver Calculation Options	Base Calculation Options
Transient Solver Calculation Options	Base Calculation Options

<General>			
ID	160	Notes	
Label	J-59	Hyperlinks	<Collection: 0 items>

GIS-IDs

GIS-ID

<Geometry>			
X	25,666.33 ft	Y	14,794.83 ft

Active Topology	
Is Active?	True

Demand Collection

Demand (Base) (gpm)	Pattern (Demand)
1,000.00	3 Hour Fire

Unit Demand Collection

Number of Unit Demands	Unit Demand	Unit Demand Unit	Demand (Base) (gpm)

Pattern (Demand)

Junction Detailed Report: J-59

Fire Flow

Specify Local Fire Flow Constraints?	False

Physical

Elevation	60.00 ft	Emitter Coefficient	0.000 gpm/psi^n
Zone	<None>		

Pressure Dependent Demand

Use Local Pressure Dependent Demand Data?	False

Transient (Initial)

Vapor Volume (Initial)	0.0 gal

Water Quality

Age (Initial)	0.000 hours	Is Constituent Source?	False
Concentration (Initial)	0.0 mg/L	Trace (Initial)	0.0 %

Results (Fire Flow)

Satisfies Fire Flow Constraints?	(N/A)	Fire Flow (Total Upper Limit)	(N/A) gpm
Fire Flow (Available)	(N/A) gpm	Pressure (Calculated Residual @ Total Flow Needed)	(N/A) psi
Pressure (Calculated Residual)	(N/A) psi	Pressure (Calculated Zone Lower Limit @ Total Flow Needed)	(N/A) psi
Pressure (Calculated Zone Lower Limit)	(N/A) psi	Velocity of Maximum Pipe	(N/A) ft/s
Pressure (Calculated System Lower Limit)	(N/A) psi	Junction w/ Minimum Pressure (System)	(N/A)
Is Fire Flow Run Balanced?	(N/A)	Junction w/ Minimum Pressure (Zone)	(N/A)
Fire Flow Iterations	(N/A)	Pipe w/ Maximum Velocity	(N/A)
Flow (Total Needed)	(N/A) gpm	Junction w/ Minimum Pressure (Zone @ Total Flow Needed)	(N/A)
Flow (Total Available)	(N/A) gpm		

Results (Pressure Dependent Demands)

Demand Shortage	0 gpm	Shortfall (Cumulative)	0.00 MG
Demand (Cumulative)	0.06 MG	Supply Rate (Cumulative)	100.0 %
Supply (Cumulative)	0.06 MG	Demand (Target)	1,000 gpm

Results (Statistics)

Demand (Minimum)	0 gpm	Age (Minimum)	(N/A) hours
Demand (Maximum)	1,000 gpm	Age (Maximum)	(N/A) hours
Hydraulic Grade (Maximum)	255.50 ft	Trace (Minimum)	(N/A) %
Hydraulic Grade (Minimum)	101.38 ft	Trace (Maximum)	(N/A) %

Junction Detailed Report: J-59

Results (Statistics)			
Pressure (Minimum)	17.9 psi	Concentration (Minimum)	(N/A) mg/L
Pressure (Maximum)	84.6 psi	Concentration (Maximum)	(N/A) mg/L

Results (Transient)			
Head (Maximum, Transient)	(N/A) ft	Pressure (Minimum, Transient)	(N/A) psi
Head (Minimum, Transient)	(N/A) ft	Air Volume (Maximum, Transient)	(N/A) gal
Pressure (Maximum, Transient)	(N/A) psi	Vapor Volume (Maximum, Transient)	(N/A) gal

Results (Water Quality)			
Age (Calculated)	(N/A) hours	Concentration (Calculated)	(N/A) mg/L
Trace (Calculated)	(N/A) %		

Results			
Hydraulic Grade	101.38 ft	Pressure Head	41.38 ft
Demand	1,000 gpm	Demand Adjusted Population	(N/A) Capita
Pressure	17.9 psi	Has Calculation Messages Now?	False

Calculated Results Summary

Time (hours)	Hydraulic Grade (ft)	Pressure (psi)	Demand (gpm)
0.000	255.50	84.6	0
1.000	255.50	84.6	0
2.000	255.50	84.6	0
3.000	255.50	84.6	0
4.000	255.50	84.6	0
5.000	255.50	84.6	0
6.000	255.50	84.6	0
7.000	255.50	84.6	0
8.000	255.50	84.6	0
9.000	255.50	84.6	0
10.000	255.50	84.6	0
11.000	255.50	84.6	0
12.000	255.50	84.6	0
13.000	255.50	84.6	0
14.000	255.50	84.6	0
15.000	255.50	84.6	0
16.000	255.50	84.6	0
17.000	255.50	84.6	0
18.000	101.38	17.9	1,000
19.000	101.38	17.9	1,000
20.000	101.38	17.9	1,000
21.000	255.50	84.6	0
22.000	255.50	84.6	0
23.000	255.50	84.6	0

Junction Detailed Report: J-59

Calculated Results Summary

Time (hours)	Hydraulic Grade (ft)	Pressure (psi)	Demand (gpm)
24.000	255.50	84.6	0

Junction Detailed Report: J-60

Scenario Summary	
ID	1
Label	Base
Notes	
Active Topology	Base Active Topology
Physical	Base Physical
Demand	Base Demand
Initial Settings	Base Initial Settings
Operational	Base Operational
Age	Base Age
Constituent	Base Constituent
Trace	Base Trace
Fire Flow	Base Fire Flow
Flushing	Base Flushing
Energy Cost	Base Energy Cost
Transient	Base Transient
Pressure Dependent Demand	Base Pressure Dependent Demand
Failure History	Base Failure History
User Data Extensions	Base User Data Extensions
Steady State/EPS Solver Calculation Options	Base Calculation Options
Transient Solver Calculation Options	Base Calculation Options

<General>			
ID	162	Notes	
Label	J-60	Hyperlinks	<Collection: 0 items>

GIS-IDs

GIS-ID

<Geometry>			
X	25,215.58 ft	Y	14,575.85 ft

Active Topology	
Is Active?	True

Demand Collection

Demand (Base) (gpm)	Pattern (Demand)
1,000.00	3 Hour Fire

Unit Demand Collection

Number of Unit Demands	Unit Demand	Unit Demand Unit	Demand (Base) (gpm)	Pattern (Demand)

Junction Detailed Report: J-60

Fire Flow

Specify Local Fire Flow Constraints?	False		

Physical

Elevation	60.00 ft	Emitter Coefficient	0.000 gpm/psi^n
Zone	<None>		

Pressure Dependent Demand

Use Local Pressure Dependent Demand Data?	False		

Transient (Initial)

Vapor Volume (Initial)	0.0 gal		

Water Quality

Age (Initial)	0.000 hours	Is Constituent Source?	False
Concentration (Initial)	0.0 mg/L	Trace (Initial)	0.0 %

Results (Fire Flow)

Satisfies Fire Flow Constraints?	(N/A)	Fire Flow (Total Upper Limit)	(N/A) gpm
Fire Flow (Available)	(N/A) gpm	Pressure (Calculated Residual @ Total Flow Needed)	(N/A) psi
Pressure (Calculated Residual)	(N/A) psi	Pressure (Calculated Zone Lower Limit @ Total Flow Needed)	(N/A) psi
Pressure (Calculated Zone Lower Limit)	(N/A) psi	Velocity of Maximum Pipe	(N/A) ft/s
Pressure (Calculated System Lower Limit)	(N/A) psi	Junction w/ Minimum Pressure (System)	(N/A)
Is Fire Flow Run Balanced?	(N/A)	Junction w/ Minimum Pressure (Zone)	(N/A)
Fire Flow Iterations	(N/A)	Pipe w/ Maximum Velocity	(N/A)
Flow (Total Needed)	(N/A) gpm	Junction w/ Minimum Pressure (Zone @ Total Flow Needed)	(N/A)
Flow (Total Available)	(N/A) gpm		

Results (Pressure Dependent Demands)

Demand Shortage	0 gpm	Shortfall (Cumulative)	0.00 MG
Demand (Cumulative)	0.06 MG	Supply Rate (Cumulative)	100.0 %
Supply (Cumulative)	0.06 MG	Demand (Target)	1,000 gpm

Results (Statistics)

Demand (Minimum)	0 gpm	Age (Minimum)	(N/A) hours
Demand (Maximum)	1,000 gpm	Age (Maximum)	(N/A) hours
Hydraulic Grade (Maximum)	255.50 ft	Trace (Minimum)	(N/A) %
Hydraulic Grade (Minimum)	97.86 ft	Trace (Maximum)	(N/A) %

Junction Detailed Report: J-60

Results (Statistics)

Pressure (Minimum)	16.4 psi	Concentration (Minimum)	(N/A) mg/L
Pressure (Maximum)	84.6 psi	Concentration (Maximum)	(N/A) mg/L

Results (Transient)

Head (Maximum, Transient)	(N/A) ft	Pressure (Minimum, Transient)	(N/A) psi
Head (Minimum, Transient)	(N/A) ft	Air Volume (Maximum, Transient)	(N/A) gal
Pressure (Maximum, Transient)	(N/A) psi	Vapor Volume (Maximum, Transient)	(N/A) gal

Results (Water Quality)

Age (Calculated)	(N/A) hours	Concentration (Calculated)	(N/A) mg/L
Trace (Calculated)	(N/A) %		

Results

Hydraulic Grade	97.86 ft	Pressure Head	37.86 ft
Demand	1,000 gpm	Demand Adjusted Population	(N/A) Capita
Pressure	16.4 psi	Has Calculation Messages Now?	False

Calculated Results Summary

Time (hours)	Hydraulic Grade (ft)	Pressure (psi)	Demand (gpm)
0.000	255.50	84.6	0
1.000	255.50	84.6	0
2.000	255.50	84.6	0
3.000	255.50	84.6	0
4.000	255.50	84.6	0
5.000	255.50	84.6	0
6.000	255.50	84.6	0
7.000	255.50	84.6	0
8.000	255.50	84.6	0
9.000	255.50	84.6	0
10.000	255.50	84.6	0
11.000	255.50	84.6	0
12.000	255.50	84.6	0
13.000	255.50	84.6	0
14.000	255.50	84.6	0
15.000	255.50	84.6	0
16.000	255.50	84.6	0
17.000	255.50	84.6	0
18.000	97.86	16.4	1,000
19.000	97.86	16.4	1,000
20.000	97.86	16.4	1,000
21.000	255.50	84.6	0
22.000	255.50	84.6	0
23.000	255.50	84.6	0

Junction Detailed Report: J-60

Calculated Results Summary

Time (hours)	Hydraulic Grade (ft)	Pressure (psi)	Demand (gpm)
24.000	255.50	84.6	0

Junction Detailed Report: J-61

Scenario Summary	
ID	1
Label	Base
Notes	
Active Topology	Base Active Topology
Physical	Base Physical
Demand	Base Demand
Initial Settings	Base Initial Settings
Operational	Base Operational
Age	Base Age
Constituent	Base Constituent
Trace	Base Trace
Fire Flow	Base Fire Flow
Flushing	Base Flushing
Energy Cost	Base Energy Cost
Transient	Base Transient
Pressure Dependent Demand	Base Pressure Dependent Demand
Failure History	Base Failure History
User Data Extensions	Base User Data Extensions
Steady State/EPS Solver Calculation Options	Base Calculation Options
Transient Solver Calculation Options	Base Calculation Options

<General>			
ID	164	Notes	
Label	J-61	Hyperlinks	<Collection: 0 items>

GIS-IDs

GIS-ID

<Geometry>			
X	24,766.66 ft	Y	14,355.04 ft

Active Topology	
Is Active?	True

Demand Collection

Demand (Base) (gpm)	Pattern (Demand)
1,000.00	3 Hour Fire

Unit Demand Collection

Number of Unit Demands	Unit Demand	Unit Demand Unit	Demand (Base) (gpm)	Pattern (Demand)

Junction Detailed Report: J-61

Fire Flow

Specify Local Fire Flow Constraints?	False		

Physical

Elevation	60.00 ft	Emitter Coefficient	0.000 gpm/psi^n
Zone	<None>		

Pressure Dependent Demand

Use Local Pressure Dependent Demand Data?	False		

Transient (Initial)

Vapor Volume (Initial)	0.0 gal		

Water Quality

Age (Initial)	0.000 hours	Is Constituent Source?	False
Concentration (Initial)	0.0 mg/L	Trace (Initial)	0.0 %

Results (Fire Flow)

Satisfies Fire Flow Constraints?	(N/A)	Fire Flow (Total Upper Limit)	(N/A) gpm
Fire Flow (Available)	(N/A) gpm	Pressure (Calculated Residual @ Total Flow Needed)	(N/A) psi
Pressure (Calculated Residual)	(N/A) psi	Pressure (Calculated Zone Lower Limit @ Total Flow Needed)	(N/A) psi
Pressure (Calculated Zone Lower Limit)	(N/A) psi	Velocity of Maximum Pipe	(N/A) ft/s
Pressure (Calculated System Lower Limit)	(N/A) psi	Junction w/ Minimum Pressure (System)	(N/A)
Is Fire Flow Run Balanced?	(N/A)	Junction w/ Minimum Pressure (Zone)	(N/A)
Fire Flow Iterations	(N/A)	Pipe w/ Maximum Velocity	(N/A)
Flow (Total Needed)	(N/A) gpm	Junction w/ Minimum Pressure (Zone @ Total Flow Needed)	(N/A)
Flow (Total Available)	(N/A) gpm		

Results (Pressure Dependent Demands)

Demand Shortage	0 gpm	Shortfall (Cumulative)	0.00 MG
Demand (Cumulative)	0.06 MG	Supply Rate (Cumulative)	100.0 %
Supply (Cumulative)	0.06 MG	Demand (Target)	1,000 gpm

Results (Statistics)

Demand (Minimum)	0 gpm	Age (Minimum)	(N/A) hours
Demand (Maximum)	1,000 gpm	Age (Maximum)	(N/A) hours
Hydraulic Grade (Maximum)	255.50 ft	Trace (Minimum)	(N/A) %
Hydraulic Grade (Minimum)	96.89 ft	Trace (Maximum)	(N/A) %

Junction Detailed Report: J-61

Results (Statistics)			
Pressure (Minimum)	16.0 psi	Concentration (Minimum)	(N/A) mg/L
Pressure (Maximum)	84.6 psi	Concentration (Maximum)	(N/A) mg/L

Results (Transient)			
Head (Maximum, Transient)	(N/A) ft	Pressure (Minimum, Transient)	(N/A) psi
Head (Minimum, Transient)	(N/A) ft	Air Volume (Maximum, Transient)	(N/A) gal
Pressure (Maximum, Transient)	(N/A) psi	Vapor Volume (Maximum, Transient)	(N/A) gal

Results (Water Quality)			
Age (Calculated)	(N/A) hours	Concentration (Calculated)	(N/A) mg/L
Trace (Calculated)	(N/A) %		

Results			
Hydraulic Grade	96.89 ft	Pressure Head	36.89 ft
Demand	1,000 gpm	Demand Adjusted Population	(N/A) Capita
Pressure	16.0 psi	Has Calculation Messages Now?	False

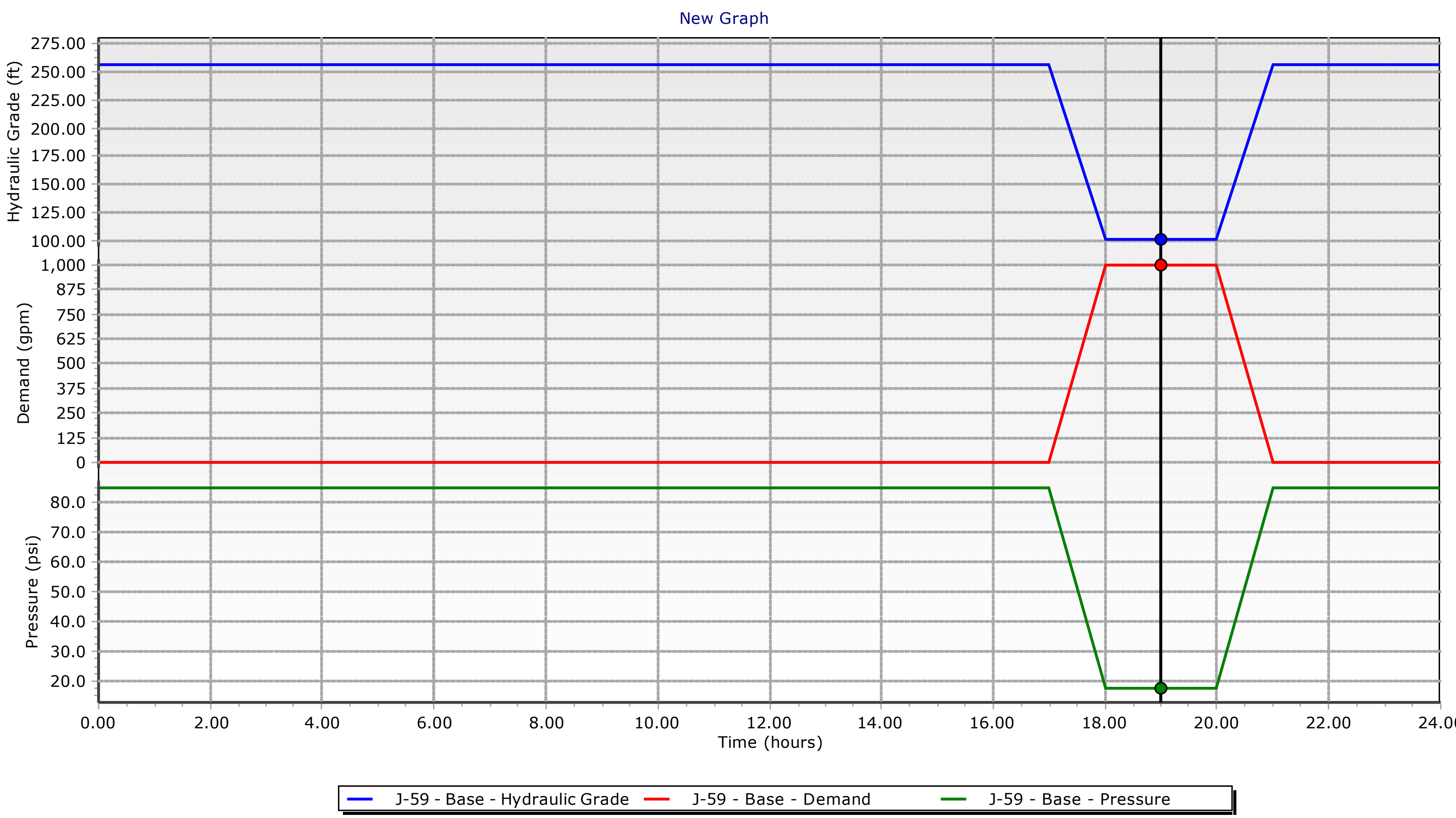
Calculated Results Summary

Time (hours)	Hydraulic Grade (ft)	Pressure (psi)	Demand (gpm)
0.000	255.50	84.6	0
1.000	255.50	84.6	0
2.000	255.50	84.6	0
3.000	255.50	84.6	0
4.000	255.50	84.6	0
5.000	255.50	84.6	0
6.000	255.50	84.6	0
7.000	255.50	84.6	0
8.000	255.50	84.6	0
9.000	255.50	84.6	0
10.000	255.50	84.6	0
11.000	255.50	84.6	0
12.000	255.50	84.6	0
13.000	255.50	84.6	0
14.000	255.50	84.6	0
15.000	255.50	84.6	0
16.000	255.50	84.6	0
17.000	255.50	84.6	0
18.000	96.89	16.0	1,000
19.000	96.89	16.0	1,000
20.000	96.89	16.0	1,000
21.000	255.50	84.6	0
22.000	255.50	84.6	0
23.000	255.50	84.6	0

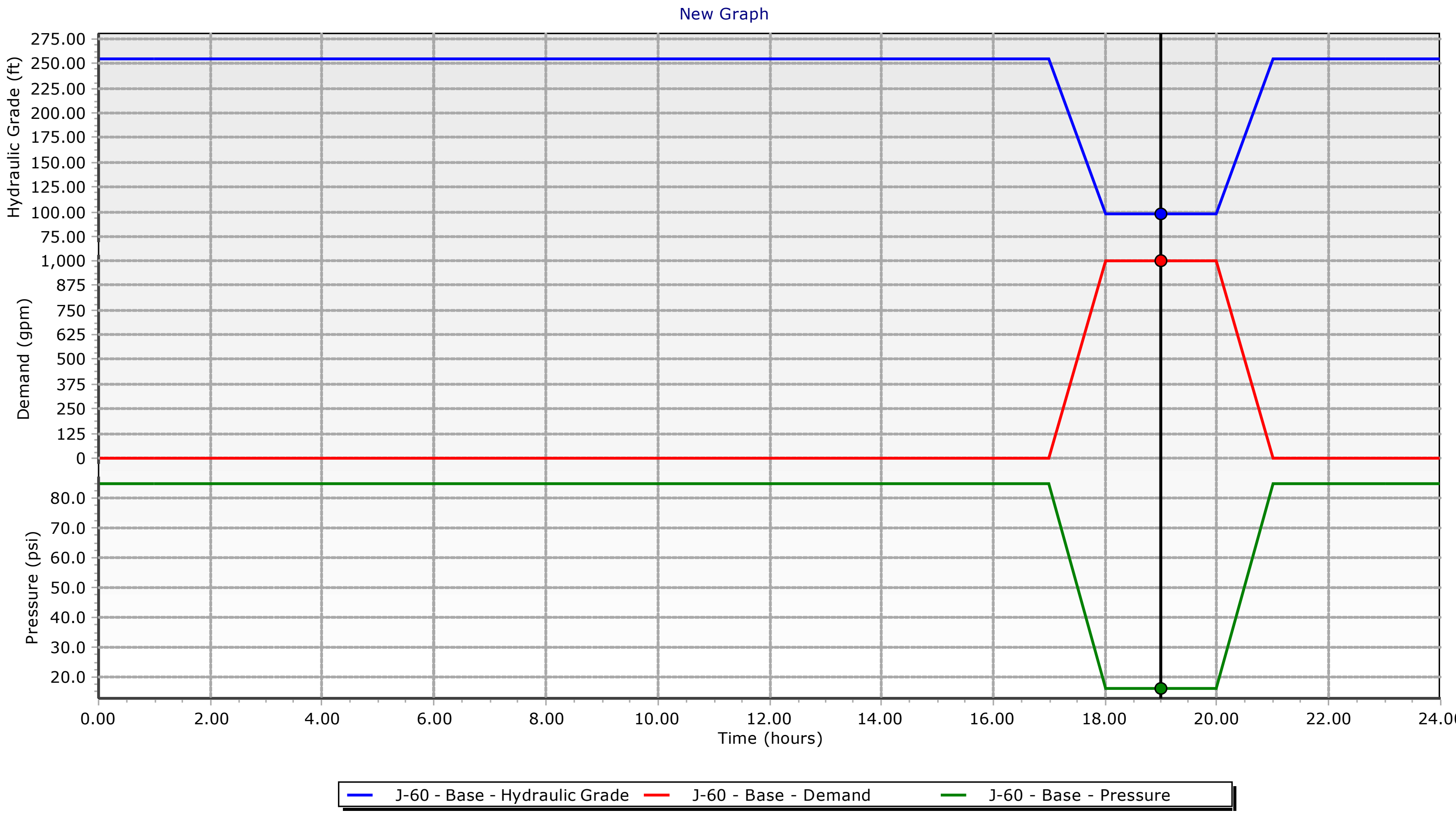
Junction Detailed Report: J-61

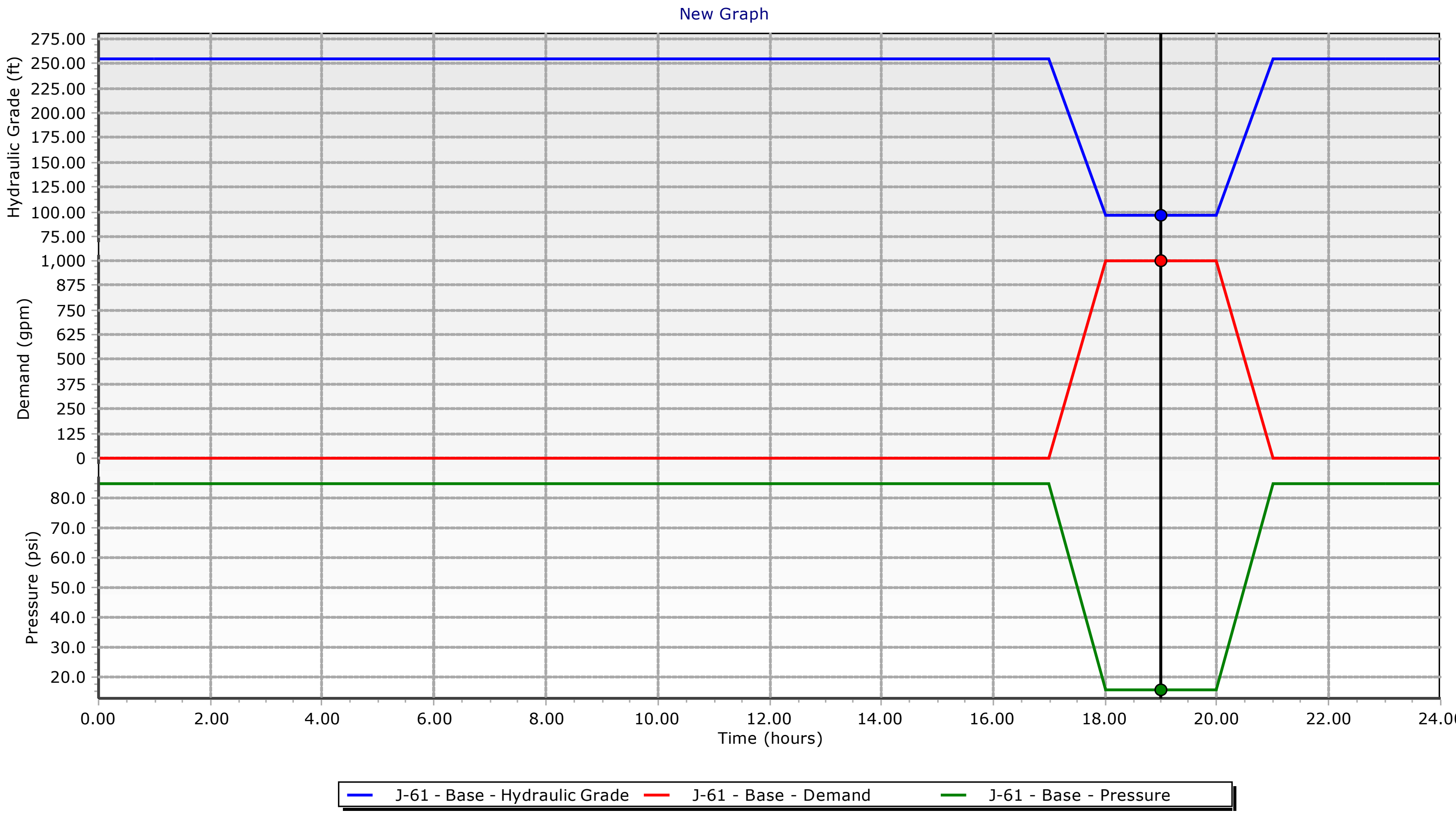
Calculated Results Summary

Time (hours)	Hydraulic Grade (ft)	Pressure (psi)	Demand (gpm)
24.000	255.50	84.6	0



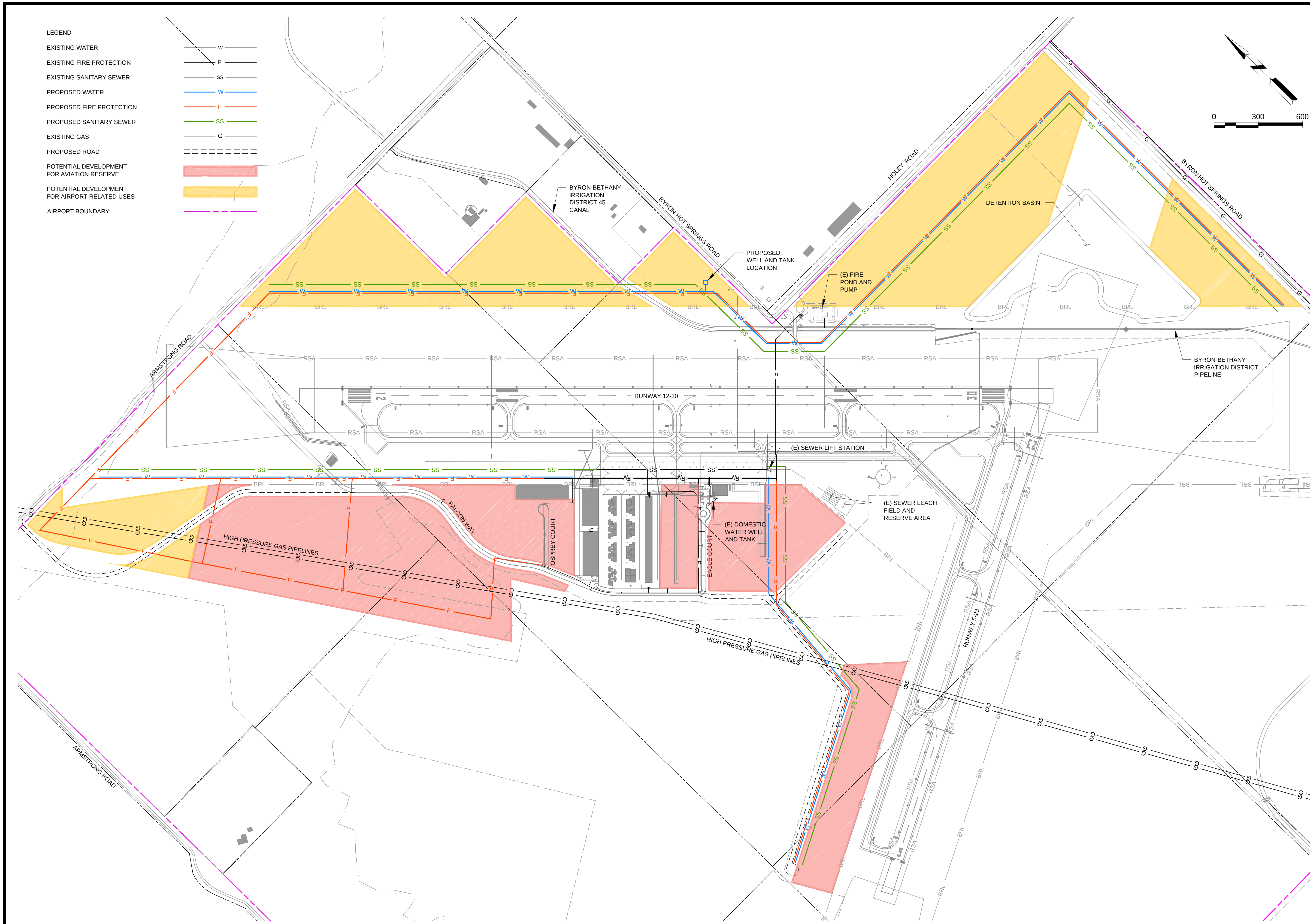
New Graph
Hydraulic Grade (ft)
275.00
250.00
225.00
200.00
175.00
150.00
125.00
100.00
Demand (gpm)
1,000
875
750
625
500
375
250
125
0
Pressure (psi)
80.0
70.0
60.0
50.0
40.0
30.0
20.0
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
18.00
20.00
22.00
24.00
Time (hours)
J-59 - Base - Hydraulic Grade
J-59 - Base - Demand
J-59 - Base - Pressure


New Graph
Hydraulic Grade (ft)
275.00
250.00
225.00
200.00
175.00
150.00
125.00
100.00
75.00
Demand (gpm)
1,000
875
750
625
500
375
250
125
0
Pressure (psi)
80.0
70.0
60.0
50.0
40.0
30.0
20.0
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
18.00
20.00
22.00
24.00
Time (hours)
J-60 - Base - Hydraulic Grade
J-60 - Base - Demand
J-60 - Base - Pressure



New Graph
Hydraulic Grade (ft)
275.00
250.00
225.00
200.00
175.00
150.00
125.00
100.00
75.00
Demand (gpm)
1,000
875
750
625
500
375
250
125
0
Pressure (psi)
80.0
70.0
60.0
50.0
40.0
30.0
20.0
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
18.00
20.00
22.00
24.00
Time (hours)
J-61 - Base - Hydraulic Grade
J-61 - Base - Demand
J-61 - Base - Pressure

Appendix D Potential Development Utility Map



Mead & Hunt

Mead & Hunt, Inc.
180 Promenade Circle,
Suite 240
Sacramento, CA 95834
phone: 916-971-3961
meadhunt.com

CONTRA COSTA COUNTY
BYRON AIRPORT
Infrastructure and Utility Analysis

500 EAGLE COURT
BYRON, CA 94514

REVISION

NOT FOR CONSTRUCTION

M&H NO.:	4186500-121867.00
DATE:	AUG. 2013
DESIGNED BY:	JHK
DRAWN BY:	RSS
CHECKED BY:	JHK

DO NOT SCALE DRAWINGS

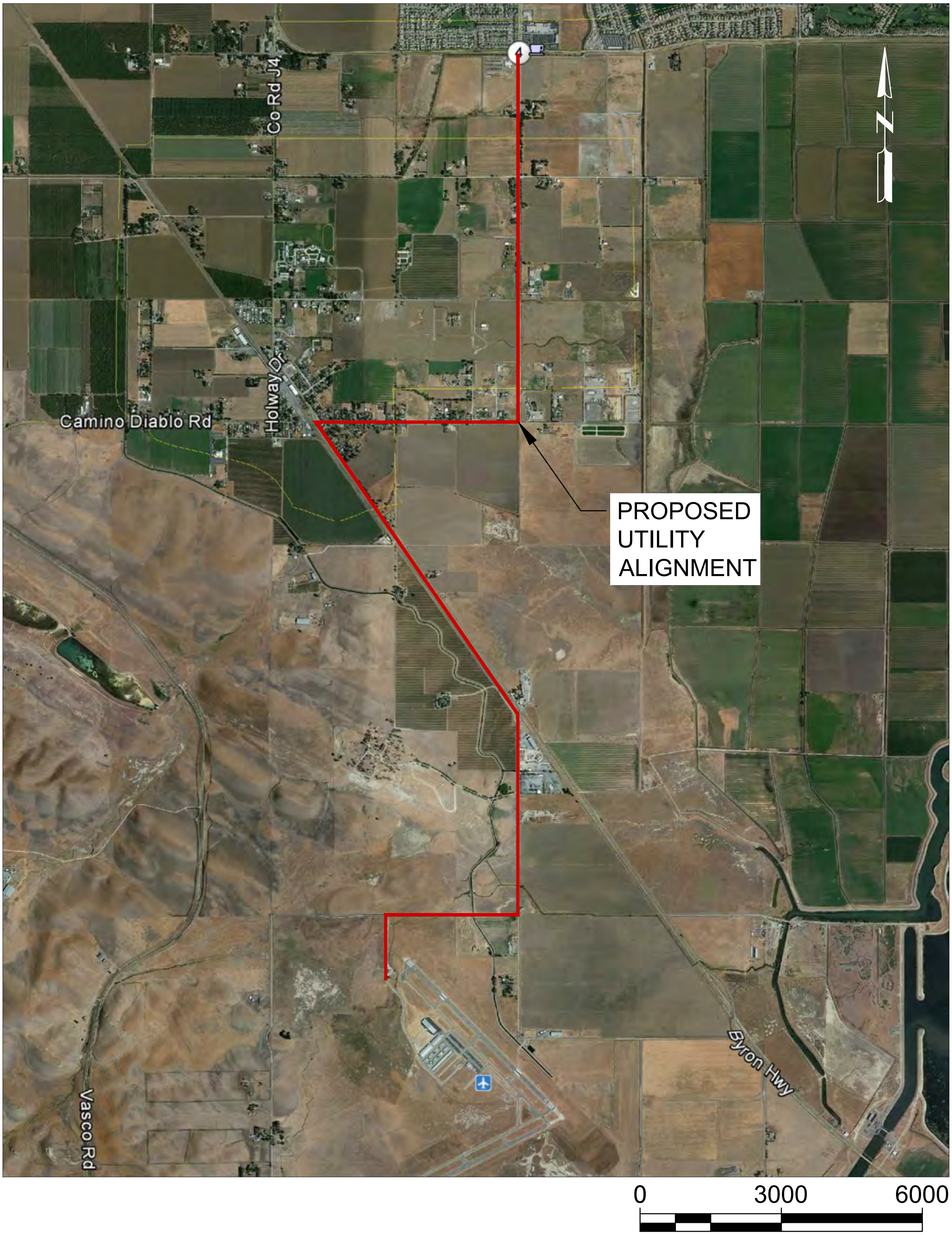
SHEET CONTENTS

POTENTIAL DEVELOPMENT UTILITY MAP

SHEET NO.

APPX-D

Appendix E Potential Connection to Discovery Bay Alignment



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CONTRA COSTA COUNTY
BYRON AIRPORT
INFRASTRUCTURE AND
UTILITY ANALYSIS

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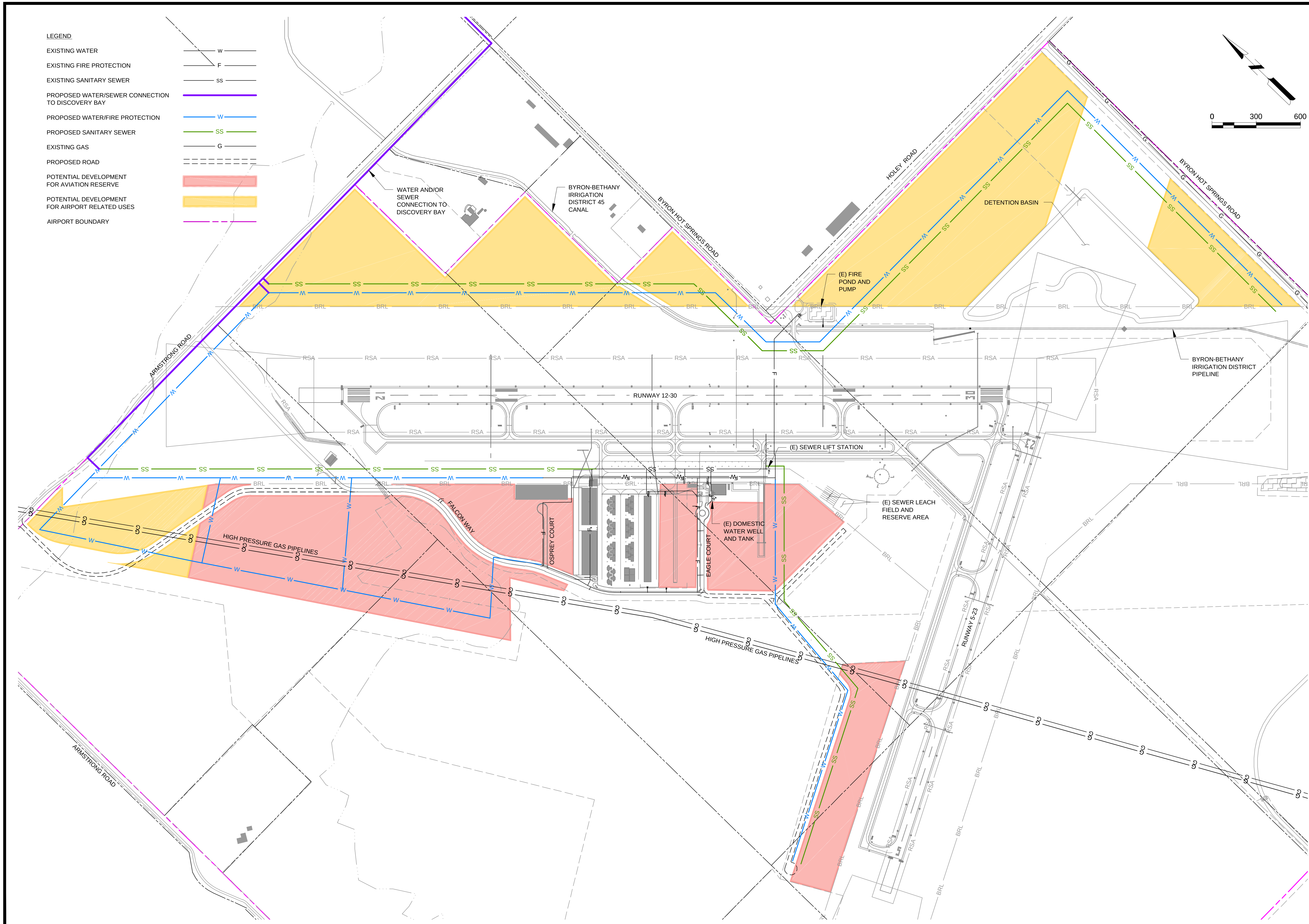
AUG 2013

POTENTIAL CONNECTION TO
DISCOVERY BAY ALIGNMENT

Mead & Hunt

APPENDIX-E

Appendix F Potential Development Utility Map – Discovery Bay Alternative



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500 EAGLE COURT
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M&H NO.: 4186500-121867.00
DATE: AUG. 2013
DESIGNED BY: JHK
DRAWN BY: RSS
CHECKED BY: JHK

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SHEET CONTENTS

POTENTIAL DEVELOPMENT UTILITY MAP DISCOVERY BAY ALTERNATIVE

SHEET NO.

APPX-F

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Appendix G Well Completion Report

ORIGINAL
File with DWR

Page 1 of 1

Owner's Well No. ____

Date Work Began 9-27-94 , Ended 9-29-94

Local Permit Agency Contra Costa County

Permit No. ____ Permit Date ____

STATE OF CALIFORNIA

WELL COMPLETION REPORT

Refer to Instruction Pamphlet

No. 567864

DWR USE ONLY — DO NOT FILL IN

01503E22

STATE WELL NO./STATION NO.

LATITUDE ____ LONGITUDE ____

APN/TRS/OTHER ____

GEOLOGIC LOG

ORIENTATION (✓) ___ VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)

DEPTH TO FIRST WATER ____ (Ft.) BELOW SURFACE

DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
0	7	clay-yell. org., very stiff
7	15	shale, clay-lite brn, hard
15	16	clay-yell. org., med. stiff
16	18	shale, clay-lite brn, hard
18	26	clay-yell. org., med. stiff
26	43	clay-grn. gray, soft
43	44	sand-dense .02-.003
44	49	sand stone-dense .02-.003
49	50	sand-brn. med. dense .02-.003
50	54	clay-very sandy, grn gray
54	55	sand-dense .02-.003
55	98	sand-clay, very sandy, stiff
98	108	clay-dark gray, med. stiff
108	110	clay-very sandy, grn gray med. stiff, .02-.003
110	116	clay-dark gray, med.stiff
116	200	clay-very sandy, med. stiff grn. gray, .02-.003

TOTAL DEPTH OF BORING 200 (Feet)

TOTAL DEPTH OF COMPLETED WELL 200 (Feet)

WELL OWNER

Name Contra Costa County-Public Works

Mailing Address 550 Sally Ride Drive

Concord CA 94520

CITY STATE ZIP

WELL LOCATION

Address Byron Hot Springs Road

City Byron

County Contra Costa

APN Book 001 Page 011 Parcel 013

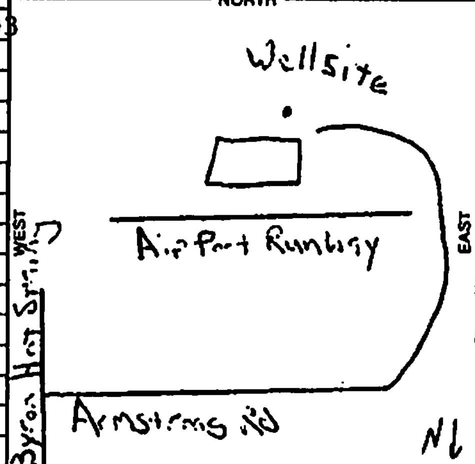
Township ____ Range ____ Section ____

Latitude ____ NORTH Longitude ____ WEST

DEG. MIN. SEC.

LOCATION SKETCH

NORTH



WEST EAST SOUTH

Illustrate or Describe Distance of Well from Landmarks such as Roads, Buildings, Fences, Rivers, etc. PLEASE BE ACCURATE & COMPLETE.

ACTIVITY (✓)

X NEW WELL

MODIFICATION/REPAIR

___ Deepen

___ Other (Specify)

___ DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")

PLANNED USE(S) (✓)

___ MONITORING

WATER SUPPLY

___ Domestic

___ Public

___ Irrigation

___ Industrial

___ "TEST WELL"

___ CATHODIC PROTECTION

___ OTHER (Specify)

DRILLING METHOD Rotary FLUID Mud

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH OF STATIC WATER LEVEL ____ (Ft.) & DATE MEASURED ____

ESTIMATED YIELD* ____ (GPM) & TEST TYPE ____

TEST LENGTH ____ (Hrs.) TOTAL DRAWDOWN ____ (Ft.)

* *May not be representative of a well's long-term yield.*

CASING(S)

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (Inches)	BLANK	SCREEN	CON-DUCTOR	FILL PIPE	MATERIAL/GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0	50	12½"	x				SDR-21	6"	.316"	
50	70	12½"		x			SDR-21	6"	.316"	1/32"
70	180	12½"	x				SDR21	6"	.316"	
180	200	12½"		x			SDR-21	6"	.316"	1/32"

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	50	x			
50	200				¼" gravel

ATTACHMENTS (✓)

___ Geologic Log

___ Well Construction Diagram

___ Geophysical Log(s)

___ Soil/Water Chemical Analyses

___ Other ____

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

NAME Dejesus Pump & Well Drilling, Inc. 1195

(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

2582 Sellers Avenue Brentwood CA 94513

ADDRESS CITY STATE ZIP

Signed ____ 9-30-94 542644

WELL DRILLER/AUTHORIZED REPRESENTATIVE DATE SIGNED C-57 LICENSE NUMBER

DWR 188 REV. 7-90

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

Appendix H Potential Connection to BBID Pump Station Alignment

0 1000 2000

CONTRA COSTA COUNTY
BYRON AIRPORT
INFRASTRUCTURE AND
UTILITY ANALYSIS

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AUG. 2013

POTENTIAL CONNECTION TO
BYRON BETHANY IRRIGATION
DISTRICT ALIGNMENT

Mead & Hunt

APPENDIX-H

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